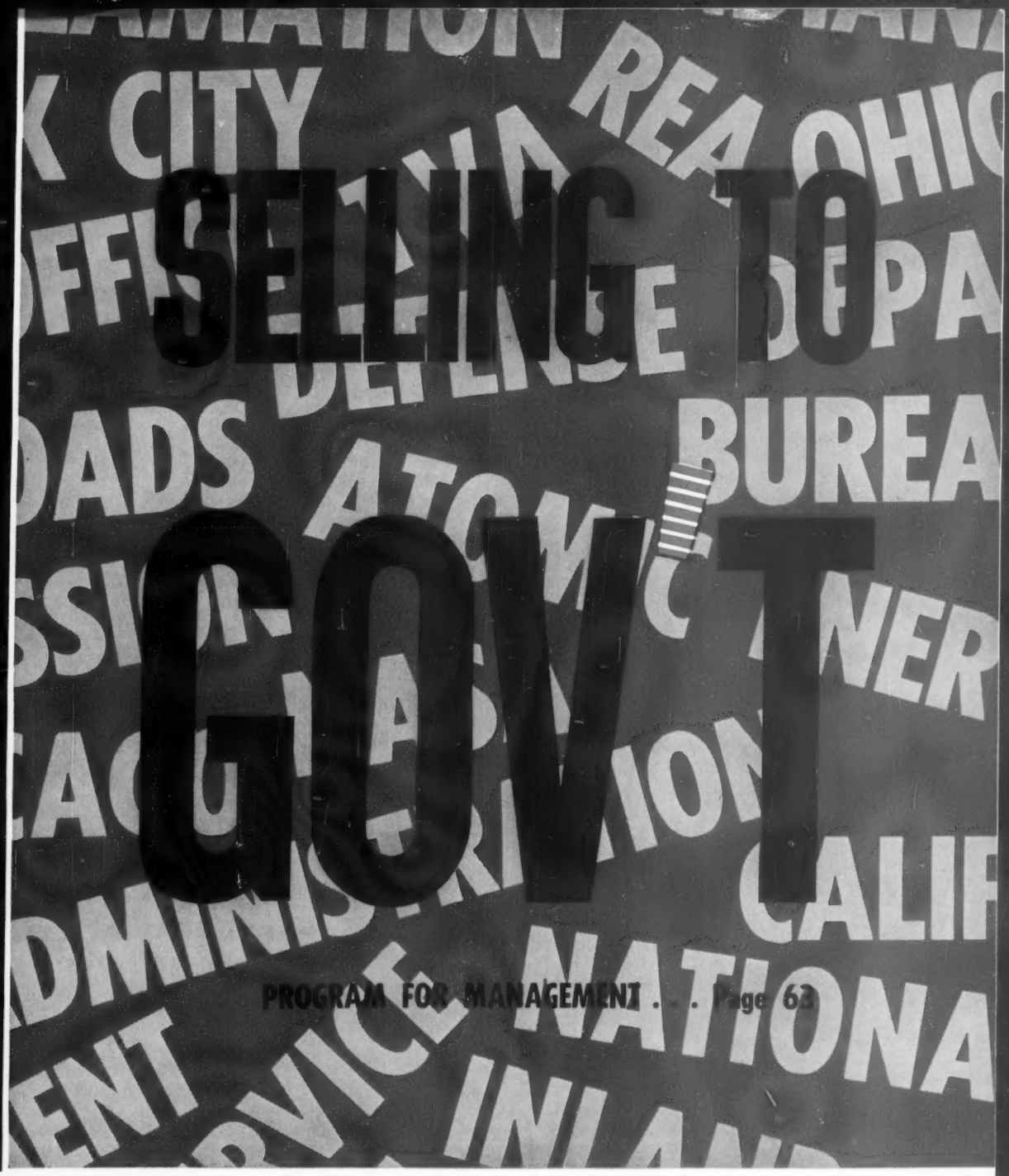
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
NOVEMBER 6, 1961



How Martin Cultivates Its Brainpower . . 56

Stirring Discovery Improves Welds 88

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Titanium Makes Another Comeback 116

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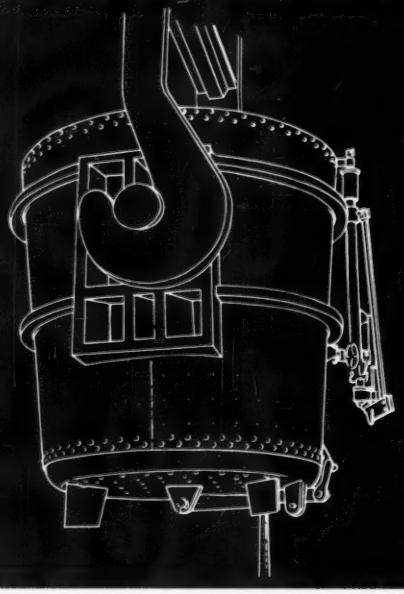
How do you begin to evaluate quality in steel tubing?



How do you begin to evaluate quality in steel tubing? The place to start is with the steel.

Before the tube you use actually begins to take shape, the physical and mechanical properties which determine tube quality have been built into the steel.

Certainly, there are quality factors of the tube such as dimensional uniformity, surface finish and heat treatment. But they can only be as good as the quality of the steel permits.

The point: the best alloy tube for your application is one that has been produced to your specifications from melt to finished tube. And, your best source is a manufacturer with integrated steel and tube making facilities. We invite you to investigate ours.

The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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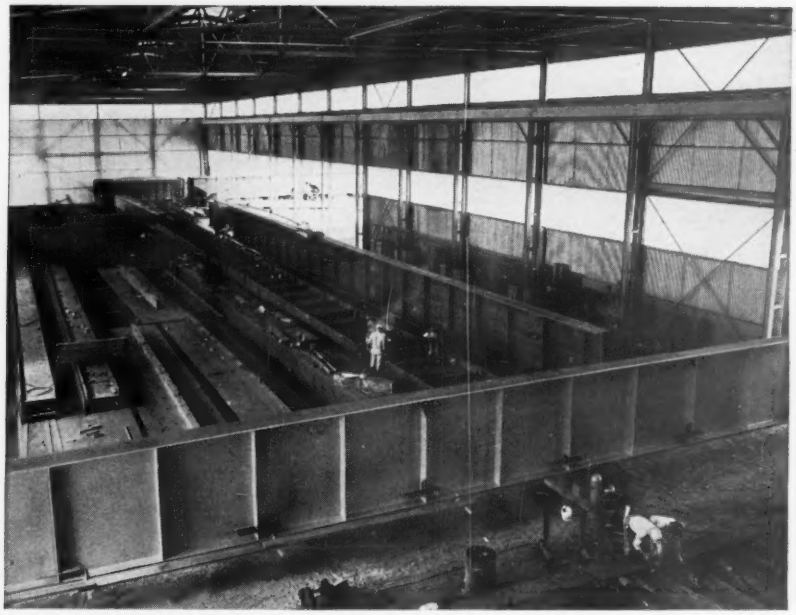
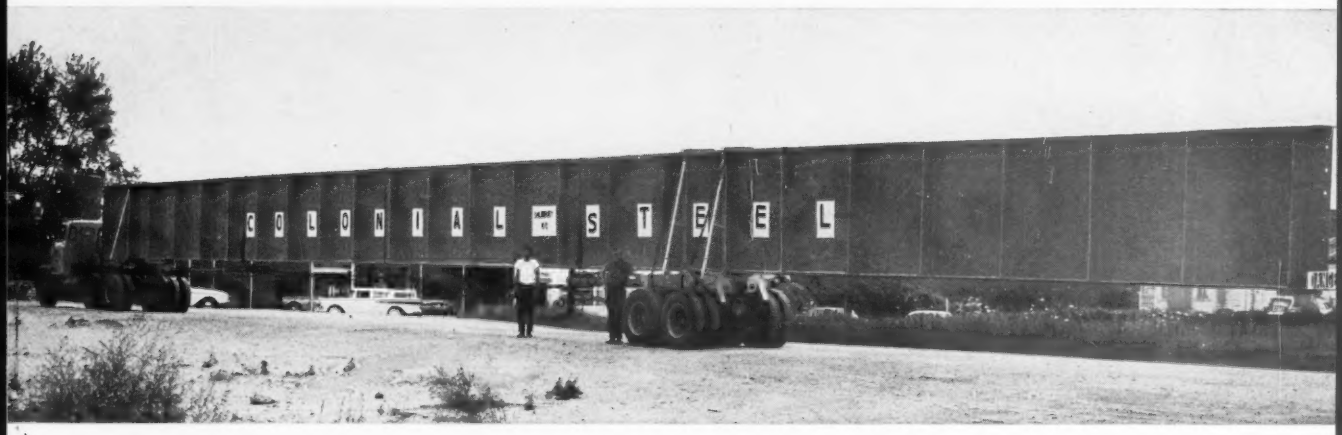


By fabricating these 147-ft long girders in one piece, instead of three 50-ft lengths as originally designed, assembly time in the field was greatly reduced.

Costs held down by flatness and good surface of Bethlehem plates... reports bridge fabricator



Fabrication of 12 steel-plate girders for a North Carolina bridge presented some king-size problems for Colonial Steel and Iron Co., Salisbury, N. C. The girders measure 147 ft long, 7½ ft high, and each weighs 30 tons.

Their large dimensions made them tricky to handle in the shop. And it took careful planning when they were trucked to the site.

Bethlehem steel plates were used in fabricating the girders. Colonial's president, Joseph Poterala, said he chose Bethlehem plate because flatness and surface condition were extremely important in keeping costs down. He knew he could count on these qualities from Bethlehem.

Steel

for Strength . . . Economy . . . Versatility

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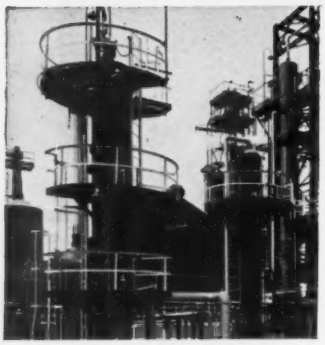
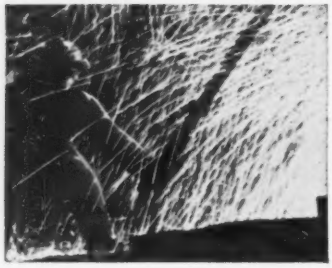


Thirty-six million dollars in new facilities . . .



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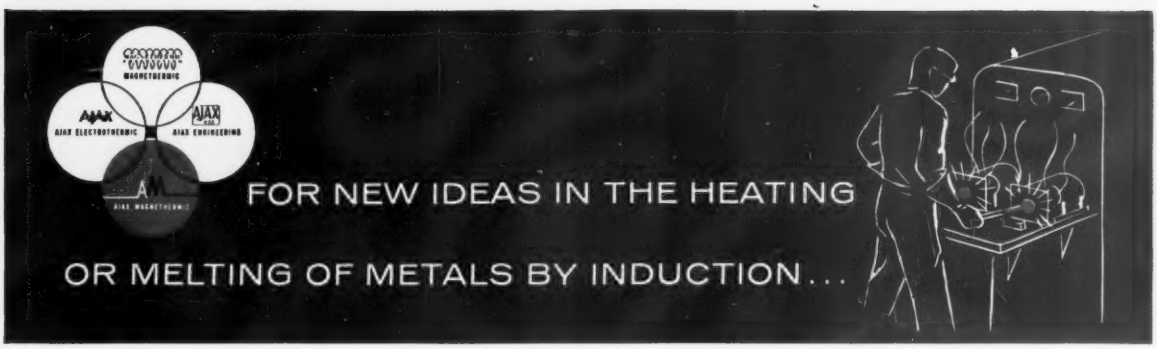

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Names and News

Kaiser, Howe Sound, Pratt & Whitney, National Acme, Composite Metal Products . . .

The corporate names flow endlessly from Associate Editor Frank Briggs's typewriter. One of his jobs is to write the company news items that begin on Page 84. Between 30 and 40 brief accounts of doings among metalworking firms appear each week in this section.

Frank joined Penton Publishing Co. in 1934 as nonferrous metals editor on a daily newspaper the company once published. He was transferred to STEEL in 1943. A graduate of the University of Michigan, he was a financial reporter with various publications before joining Penton.

Letter

Rear Adm. L. M. Mustin has this to say about Washington Editor Jack Botzum's article, "Navy's Becoming Bigger Customer" (STEEL, Oct. 2, p. 24):

"Let me congratulate you on . . . a fine piece of both factual and objective reporting, well composed and well expressed. It's a pleasure to find something like this . . . which has solid facts, draws sound conclusions from them, and eschews the somewhat hysterial non sequitur sensationalisms that we so often encounter."

Wayward Communications

Surveillance of marine radio communication along the California coast revealed a loud, continuous signal with a background of running diesel engines, ship horns, and seagull squawks. Investigation by the Federal Communications Commission led to a ship tied at a pier. Aboard, a hand microphone was found lying on its side in such a way as to depress the "talk" button. The captain was chagrined but co-operative.

Incidental Intelligence

Item: Stephen Dudash, a die-tryout man at Ford Motor Co.'s Rouge stamping plant, won a maximum award of $6000 for an idea that saves 1 in. of steel from each blank in a fender stamping operation. His idea was to relocate a die gage so the steel blanks could be inserted a little differently. That proves that the simple ideas are usually best.

Item: The Post Office Department shipped 33.2 billion pieces of first class mail in 1960 vs. 15.2 billion in 1940.

Item: Safety Clothing & Equipment Co., Cleveland, is marketing a radiation measurement kit that will enable anyone to measure radiation, help him determine when to seek shelter, where to go for the safest shelter, and how long to stay in the shelter.

Definitions

Here's an old chestnut on "isms" that we'll update:

Communism: You have two cows; the government takes both and gives you some of the milk.

Fidelism: You have two cows; the government takes both and shoots you.

New Frontierism: You have two cows; the government takes both, shoots one, milks the other, and throws the milk away.

Capitalism: You have two cows; you sell one and buy a bull.

There Ought to Be a Law

There ought to be a law that all legal holidays fall on a Monday or Friday. Thanksgiving is coming up—on Thursday, of course—and will be followed by the usual awkward Friday. More and more people take that day off too, but editors of weekly magazines can't. One day missing from the crowded week is bad enough, but two would be nearly disastrous.

We've taken a private poll on the matter, and 99.7 per cent of the people we queried favor the Monday-or-Friday plan. Geraldine, a cleaning woman in the building and our night editor, accounts for the 0.3 per cent by which we missed unanimous approval. "Let 'em fall where they want to," says she.

The editors, of course, backed us 100 per cent. Thursdays are generally good days for making calls to gather information or for writing letters. We suggest that on Thanksgiving this year each writes at least one, to his congressmen, in support of the Monday-Friday scheme.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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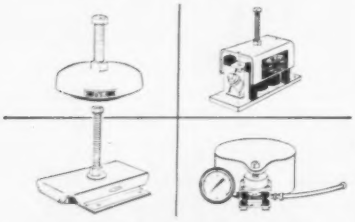

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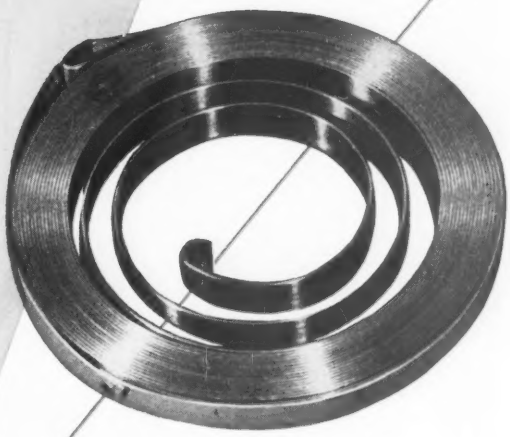

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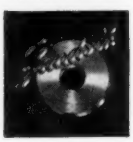

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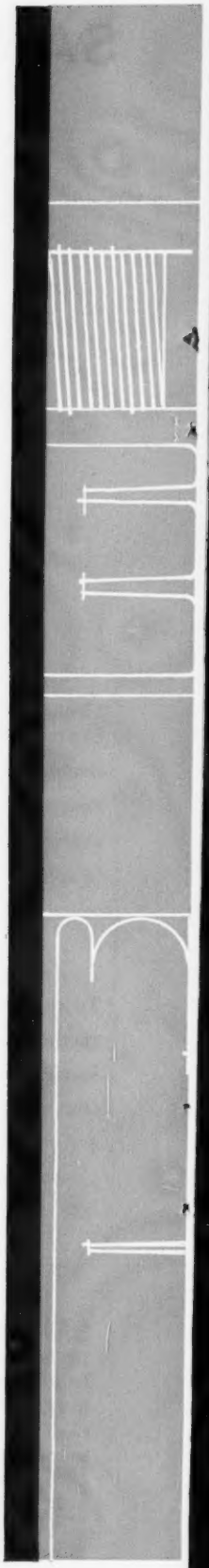

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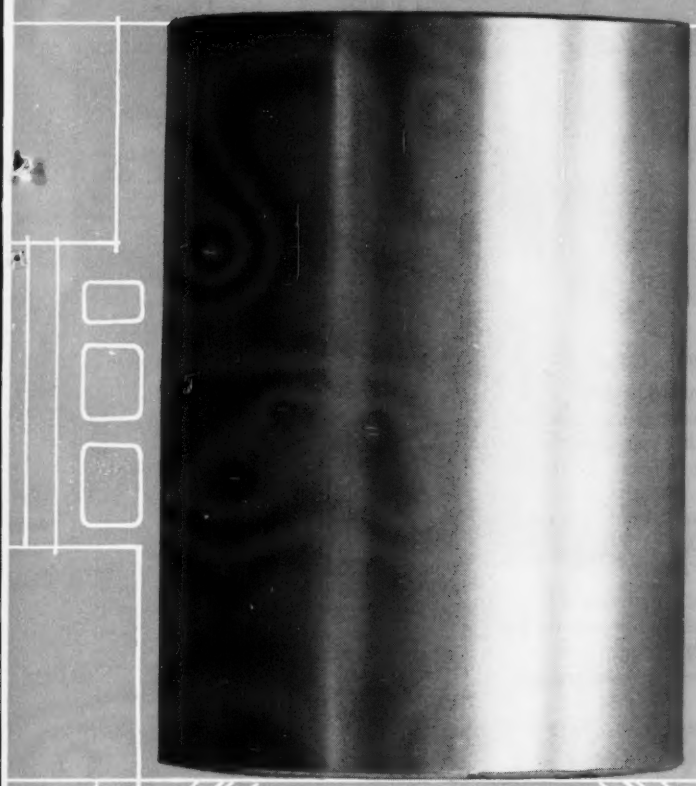

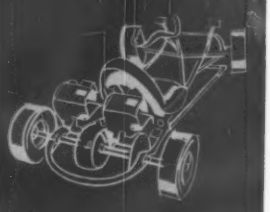

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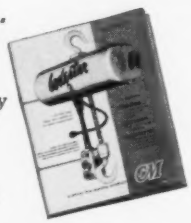

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CALENDAR OF MEETINGS

Nov. 6-9, Atomic Industrial Forum Inc.: Annual conference and exhibit (with American Nuclear Society), Conrad Hilton Hotel, Chicago. Forum's address: 850 Third Ave., New York 22, N. Y. Executive manager: Charles Robbins.

Nov. 7-10, Packaging Machinery Manufacturers Institute: PMMI Show, Cobo Hall, Detroit. Institute's address: 60 E. 42nd St., New York 17, N. Y. Executive director: Russell L. Sears.

Nov. 12-15, Air-Conditioning & Refrigeration Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute's address: 1346 Connecticut Ave. N.W., Washington 6, D. C. Managing director: George S. Jones Jr.

Nov. 13-15, Steel Founders' Society of America: Technical and operating conference, Pick-Carter Hotel, Cleveland. Society's address: 606 Terminal Tower, Cleveland 13, Ohio. Executive vice president: F. Kermit Donaldson.

Nov. 15-17, National Foundry Association: Annual meeting, Savoy Hilton Hotel, New York. Association's address: 4321 St. Charles Rd., Bellwood, Ill. Executive secretary: C. T. Sheehan.

Nov. 15-18, National Association of Aluminum Distributors: Annual convention, Arizona-Biltmore Hotel, Phoenix, Ariz. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. Bruce Wall.

Nov. 16, National Electrical Manufacturers Association: Annual meeting, Plaza Hotel, New York. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: J. F. Miller.

Nov. 18, Society of Carbide Engineers: Annual meeting, Belmont Plaza Hotel, New York. Society's address: P. O. Box 45, Newington 11, Conn. National president: Carl G. Erickson.

Nov. 21, Manufacturing Chemists' Association Inc.: Semiannual meeting and conference, Commodore Hotel, New York. Association's address: 1825 Connecticut Ave. N.W., Washington 9, D. C. Executive secretary: Maurice Crass Jr.

Nov. 26-Dec. 1, American Society of Mechanical Engineers: Winter annual meeting, Statler Hilton Hotel, New York. Society's address: 345 E. 47th St., New York, N. Y. Secretary: O. B. Schier.

Nov. 27-Dec. 1, Exposition of Chemical Industries: Biennial convention and exhibit, Coliseum, New York. Contact: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

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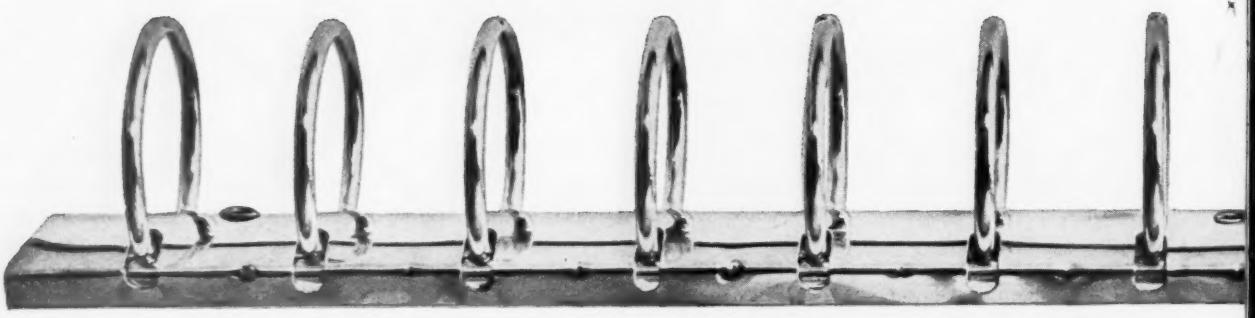
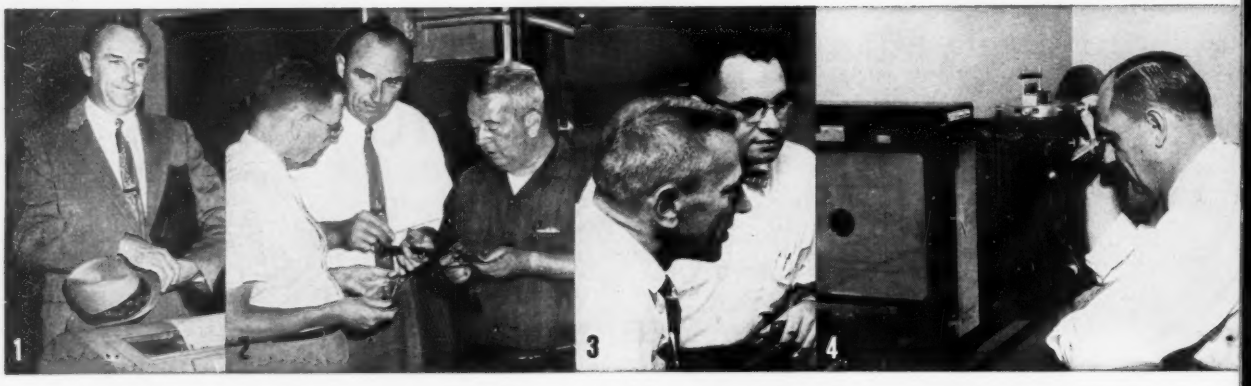
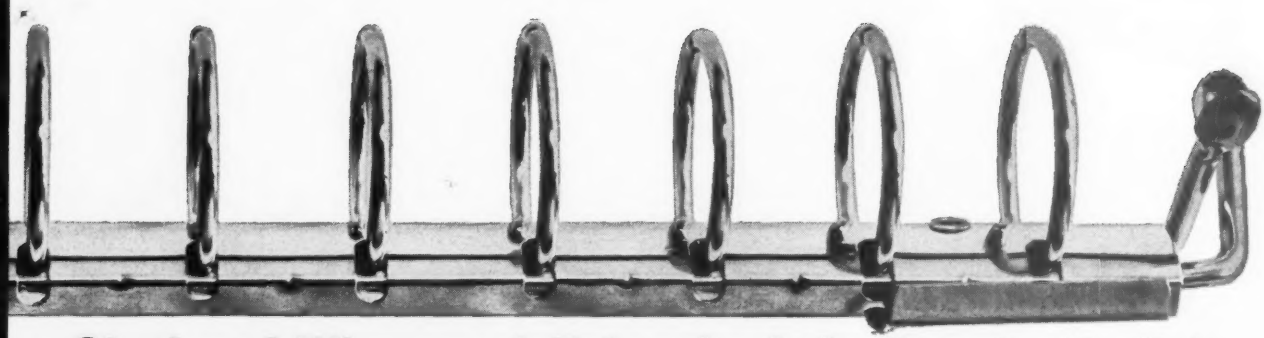


This is a new kind of ring binder. Below: the American



It opens, closes, and locks the rings, preventing spilled sheets. That's about all a ring binder does. And yet, coming up with the right wire for this binder was more than half a job. National Blank Book Company, Holyoke, Mass., asked our sales representative for an assist. He conferred with Charlie Canney—one of our top service metallurgists. **1.** Charlie met the people at National. **2.** He talked to their production people, came up with a profile of the wire they wanted. It had to have a uniform temper, the right temper for making the binder's snap-action ears, a clean, smooth surface for welding and plating, a temper which would vee-notch cleanly and still be rigid enough to stand distortion during production. **3.** Charlie took his problem back to our Worcester plant, talked it out with Clyde Westhaver, general foreman of cleaning, coating, heat treating; and Fred Brierly, product metallurgist. **4.** And then to the Metallograph—an instrument used in one of the many tests that determine the right properties. **5.** Charlie's report followed. **6.** Next, into limited production on the wire.



Steel and Wire specialists who helped make it click.

Wilfred Blades, quality control supervisor, and Francis Whalen, works metallurgist, kept close check on its condition during the initial draw. **7.** Before shipment, Arthur Weissinger and John Conrad, lab technicians, took stress-strain recordings **8.** The result: a ring binder that works just fine, and another satisfied customer. Call your American Steel and Wire salesman or nearest sales office the next time *you* need a metallurgical assist, or the best wire you can buy. American Steel and Wire, Rockefeller Building, Cleveland 13, Ohio.

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DESIGN NOTE: The Military Ranger used N-A-XTRA 90 (minimum yield strength, 90,000 psi) in bars and plates ranging to 1" thick, in main frame and cross members, loader mechanism and fork carriage. Fabrication followed standard gas cutting and welding procedures. Excellent weldability of N-A-XTRA was important in joining to other steels.

N-A-XTRA 90 plates and bars are used in the "Ranger," a rough terrain military vehicle designed, developed and fabricated jointly by the U. S. Army Quartermaster Corps and the Clark Equipment Company, Battle Creek, Michigan. The Ranger series is manufactured by the Industrial Truck Division of Clark Equipment Company.

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ROUGH TERRAIN MILITARY FORK TRUCK USES N-A-XTRA HIGH-STRENGTH STEEL FOR MAXIMUM LOADABILITY WITH MINIMUM WEIGHT

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The U. S. Army Quartermaster Corps and the Industrial Truck Division of Clark Equipment Company came up with the answer—the Military Ranger. It meets or exceeds every operating requirement. And does it within the vital weight limit by using N-A-XTRA 90 high-strength steel in main frame, cross members, loader mechanism and supporting structure. N-A-XTRA handles the job in these high-stress areas, yet weighs three times less than mild carbon steel of equivalent strength.

You may never have to air-lift your equipment, but that's not the only problem N-A-XTRA solves. Rugged operating conditions, heavy loads and weight-saving construction—in such applications as, for example, heavy machinery and pressure vessels—are challenges that N-A-XTRA is designed to meet and beat.

With excellent weldability, formability, and toughness even at subnormal temperatures, N-A-XTRA low carbon, extra-strength alloy steels give superior results with conventional fabricating methods, including cold forming, gas cutting, shearing and machining. N-A-XTRA high-strength steels are available in four levels of minimum yield strength, from 80,000 to 110,000 psi, and in sizes ranging from ⅛ to 1¼″ thick, up to 72″ wide and up to 35′ long. For further information, write Great Lakes Steel Corporation, Product Development, Dept. SM-16, P. O. Box 7310, Detroit 2, Michigan.

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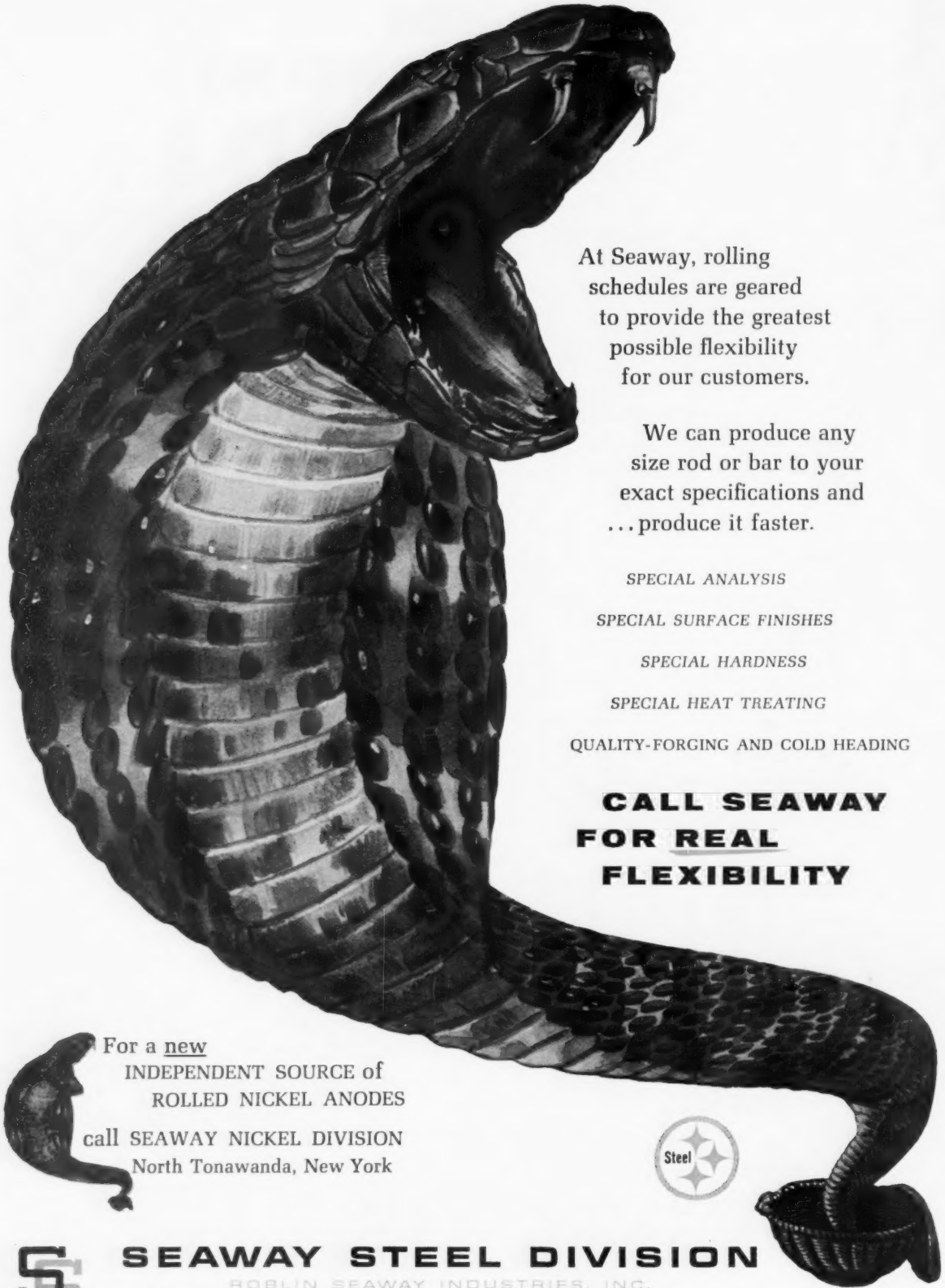
O'Neal Steel, Inc. Birmingham, Alabama	Salt Lake Hardware Co. Salt Lake City, Utah	A. C. Leslie & Company, Ltd. Montreal, Canada

NATIONAL STEEL CORPORATION



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Outlook for Steel's Fourth Quarter

Steelmakers' expectations for fourth quarter shipments vary. On the optimistic side: Logan T. Johnston (left), president, Armco Steel Corp., says: "We expect . . . shipments to be the best of the year." Roger M. Blough, chairman, U. S. Steel Corp., believes the quarter will be the best of the year for his company and the industry. Also expecting an improvement over the third quarter are: Republic Steel Corp., Inland Steel Co., Allegheny Ludlum Steel Corp., and Jones & Laughlin Steel Corp. Some companies take another view: William A. Steele (right), chairman and president, Wheeling Steel Corp., anticipates that "shipments will be slightly less than (those of) the third quarter." Kaiser Steel Corp. believes its sales and earnings "will be somewhat lower" than they were in the previous two periods.

Slump Coming in '63?

AFL-CIO economists see the possibility of a slump in 1963. They believe: If the present upswing follows previous patterns, "it will begin to run out of steam 12 to 15 months after the upturn started." They foresee a continued "rapid" rise in output, sales, and profits into mid-1962.

Construction Expenditures in the Year 2000

By 1975, construction expenditures will rise to $107 billion (in 1960 dollars); by the year 2000, they will approach a $219 billion level, predicts the Commerce Department. (The current rate is $58 billion.) Here are the department's projections of expenditures in major construction categories through the remainder of the century:

	Billions of 1960 dollars		
	1960	1975	2000
Private Housing	16.8	35	51
Commercial	4.2	7	17
Industrial	2.9	5	12.4
Public Utilities	5.3	9.2	22.8
Highways	5.5	12.1	27.5

Automatic Washer Shipments Set Record

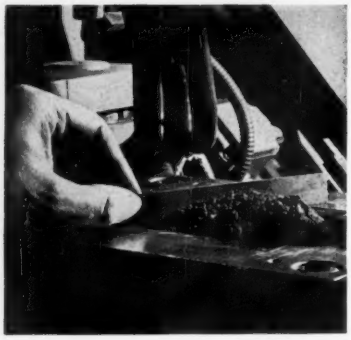
More automatic washers (323,336 units) were shipped during September than in any previous September in history, reports the American Home Laundry Manufacturers' Association. September sales were second only to the 350,000 units sold in October, 1956, boosting the total for the three quarters to

1,970,636—3 per cent above that of the corresponding 1960 period. Sales of all home laundry appliances in September showed a 24 per cent increase over August's, narrowing last year's lead for the first three quarters to 2 per cent.

Industrial Heating Equipment Orders Decline

Net new orders for industrial heating equipment during the first nine months of this year totaled $57.3 million—a decline of 8 per cent from the year ago pace, reports the Industrial Heating Equipment Association. But foreign orders rose 89 per cent to $13.3 million. September orders were 32 per cent below the $5.7 million volume in August.

Beryllides Star in Powder Fabricating Techniques



The space race has brought with it a new series of intermetallics called beryllides. Brush Beryllium Corp., developer of the materials, says they can be formed into a surprising array of shapes with various metal powder fabricating techniques. The photos show beryllide powder being fed into a plasma flame spray to build up a cone (left) and preparation of a powder in a steel die for cold pressing (right). See Page 90.

Waterside Plant Construction Rises Sharply

A growing number of firms is displaying an interest in waterside industrial plants. A survey conducted by American Waterways Operators Inc., Washington, shows that waterside plant site development in the third quarter of this year proceeded at better than three times the rate for the same period in 1960. Facility construction during the first nine months totaled 437 vs. 263 for the year ago period.

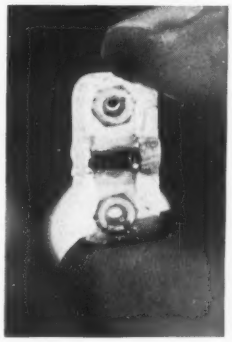
Business Abroad

Fewer ships were under construction at the close of September in Britain than at any time in the last 16 years . . . Singapore's finance minister, Dr. Goh Kerg Swee, says Japanese interests plan to invest heavily in Singapore's industry. Fuji Iron & Steel Co. is ready to participate in building a steel mill there . . . Sir Edward Warren, chairman, Australian Coal Association, says Australia's coal exports to Japan will be at least 5 million tons a year by 1965 vs. about 1,650,000 tons now . . . The discovery of a natural gas field (potential, 100 million cu ft a day) in New Zealand may lead to the establishment of a steel industry in that country. Gas might be used to smelt hitherto unused iron sands found on many beaches.

Hodges Sees Trade Balance Improving

Commerce Secretary Luther H. Hodges predicts U. S. exports will ring up more than a $5 billion margin over imports this year—topping the difference registered in 1960. Looking to 1962, he says: "Growth of our exports, we think, will come chiefly from increasing sales to the less developed countries and to Canada." Comparing U. S. and European production, he says: "Since March, U. S. output has rebounded sharply while the tempo of economic expansion in Europe seems to have slackened a little."

Solar Cells Power Punched Card Reading Unit



Solar cells like the one at right are being used to supply power to read punched cards in Burroughs Corp.'s B200 series of computers. In the computer's card reading unit, a row of lamps is positioned opposite a series of cells, and cards pass between them. Light passes through the punched out areas of the cards to the cells where it is transformed into electrical energy. The self-sufficient power sources eliminate the need for companion devices to generate electricity. Advantage: More compact computer design than is possible with conventional methods.

Continuous Vacuum Furnace for Strip Treatment

A furnace for continuous vacuum heat treatment of metal strip was described at the recent international meeting of the American Vacuum Society in Washington. A series of rolls on both sides of the strip form a seal against atmospheric pressure at the inlet and outlet. A pilot unit is in operation at a German steel plant.

Martin Cultivates Its Brainpower

"Too many of us have been diverted into a search for the unique 'uncommon man' who can solve all our problems when, instead, we should be encouraging all our 'indispensable men,'" states William B. Bergen, president, Martin Co. His company believes its greatest asset is the brainpower of its 7500 engineers and scientists. The story on Page 56 tells how Martin fosters creativity through professional recognition, incentives, improved communications and organization.

George Ball Supports Fast Writeoff, Modernization Credit

U. S. industry needs accelerated amortization to rid itself of obsolescent machinery and gain credit availability for modernization plus the funds and facilities needed for the retraining and relocation of labor. So said George W. Ball, under secretary of state for economic affairs, at the 38th National Foreign Trade convention. He was pleading for freer trade, but he recognized that much of industry needs help in competing with the lower costs

STEEL The Metalworking Weekly

November 6, 1961 Vol. 149 No. 19

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overseas. Significance: This is one of the first times an official high in the Kennedy administration has publicly come out for fast writeoffs. Mr. Ball is also one of the first outside the Commerce Department to officially support credit availability for modernization, the plan originated by Assistant Secretary Hickman Price Jr.

Automation Puts Premium on Education

To compete effectively in world trade, "industry will find that automation is indispensable," says John I. Snyder Jr., president and chairman, U. S. Industries Inc. And as automation spreads, increasing emphasis will be placed on education—workers will have to be retrained for different types of jobs, and more people will go into careers requiring higher education. Machines are needed to "supplement the work of a dangerously inadequate number of teachers," he states.

Satellites Hold Key to Communications Growth

Global communication needs are growing so rapidly that present facilities will soon be inadequate, believes General Telephone & Electronics Corp. The only efficient, economical way to meet the needs is through a satellite communications system, it says. Estimated cost: $250 million. Potential annual revenue: Billions of dollars.

Straws in the Wind

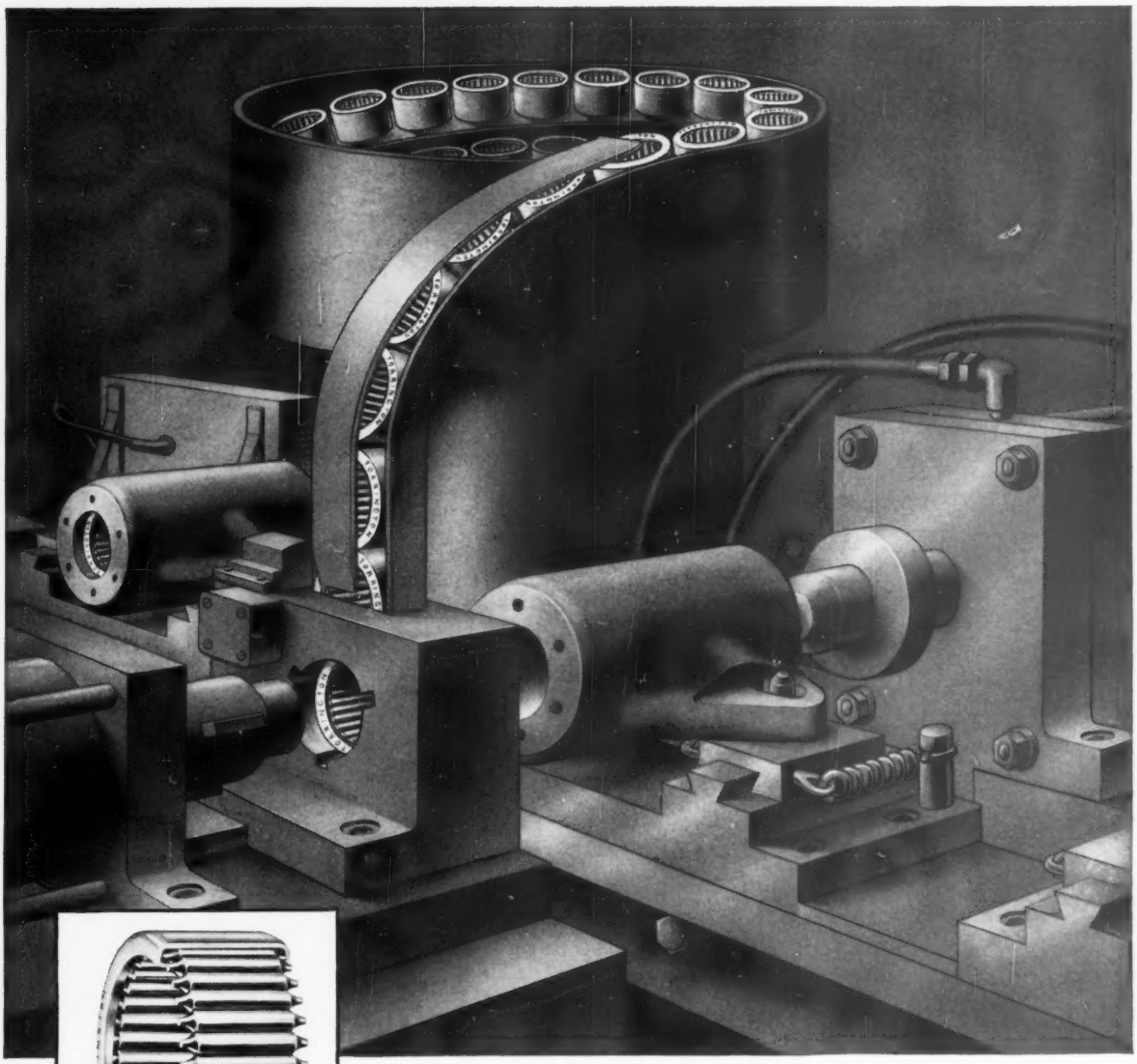
A "healthy rise" in new orders for industrial supplies and machinery in September is reported by the American Supply & Machinery Manufacturers' Association . . . Landis Tool Co., Waynesboro, Pa., announced a 7½ per cent price increase on grinding machines, parts, and accessories, effective Nov. 1 . . . The primary metals industry operated at nearly 73 per cent of capacity in September—less than 1 per cent above the August pace . . . The Commerce Department expects a good fourth quarter to boost shipments of copper base mill and foundry products for the year 3 to 5 per cent above 1960's.

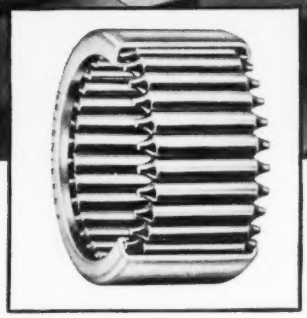
Metalworking Pulse

The Business Trend: Resumption of full production in the auto industry pushed STEEL's industrial production index to a new high for the year, 175 (1947-49=100), in the week ended Oct. 28. **Autos:** For the first time since the 1962 model run started, all automakers scheduled full production plus considerable overtime in late October. The pattern will continue well into next year. **Steel:** Slight improvement in demand prompted producers to raise ingot output cautiously.

- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49 = 100)
  Week ended Oct. 28 .... **175†**
  Year ago **153**
  Details on Page 73
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Nov. 4 .. **165,000***
  Year ago **145,537**
  Details on Page 70
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Nov. 4 . **2,068,000***
  Week ago **2,057,000**
  Details on Page 121

†Preliminary. *Estimated.





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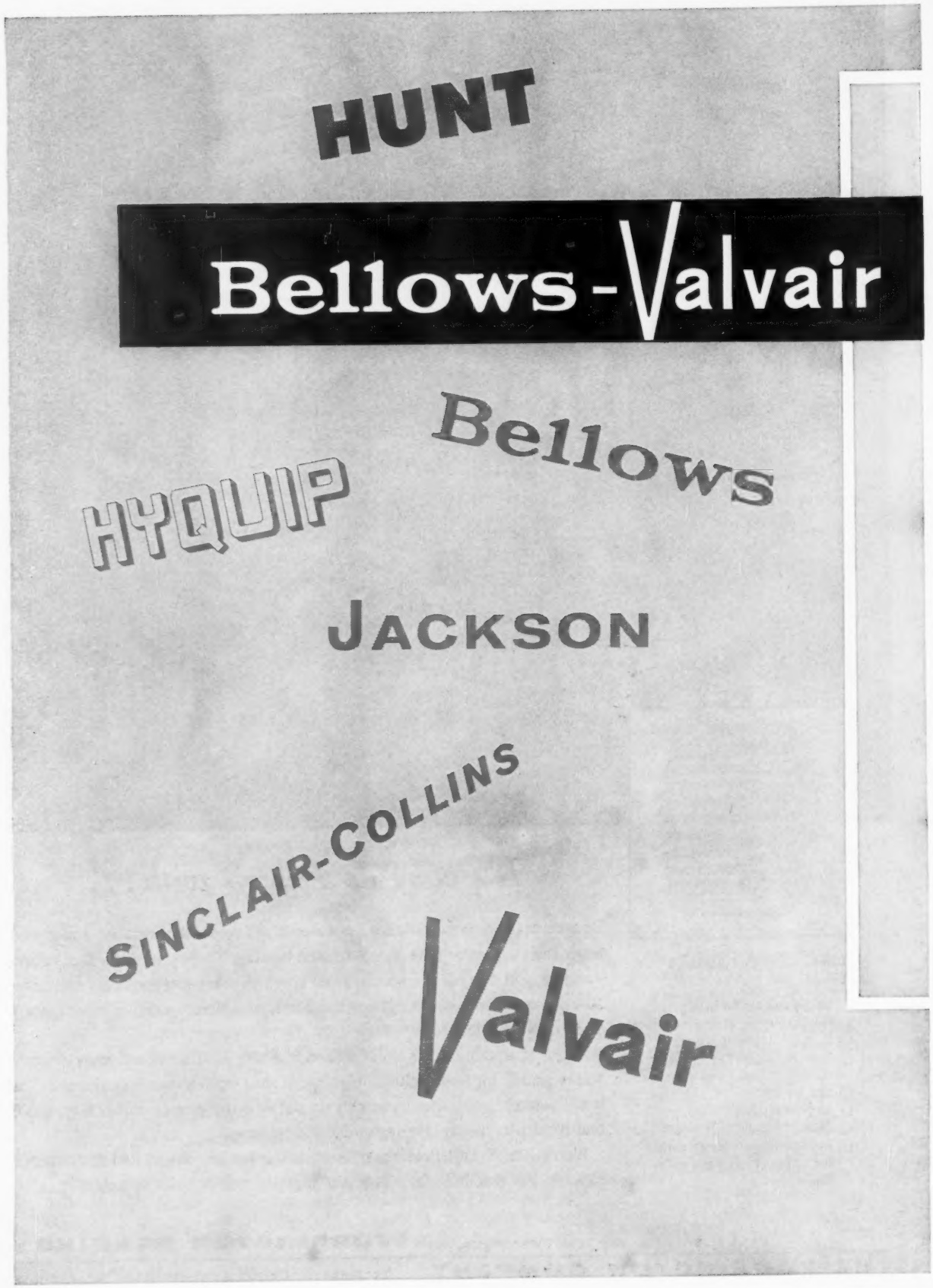
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New Bulletin FP-62 will give you more information on the divisional product groupings. For your copy, contact the field office near you (listed in the Yellow Pages and Thomas' Register, Volume IV), or write to Bellows-Valvair, Akron 9, Ohio, Dept. ST-1161.

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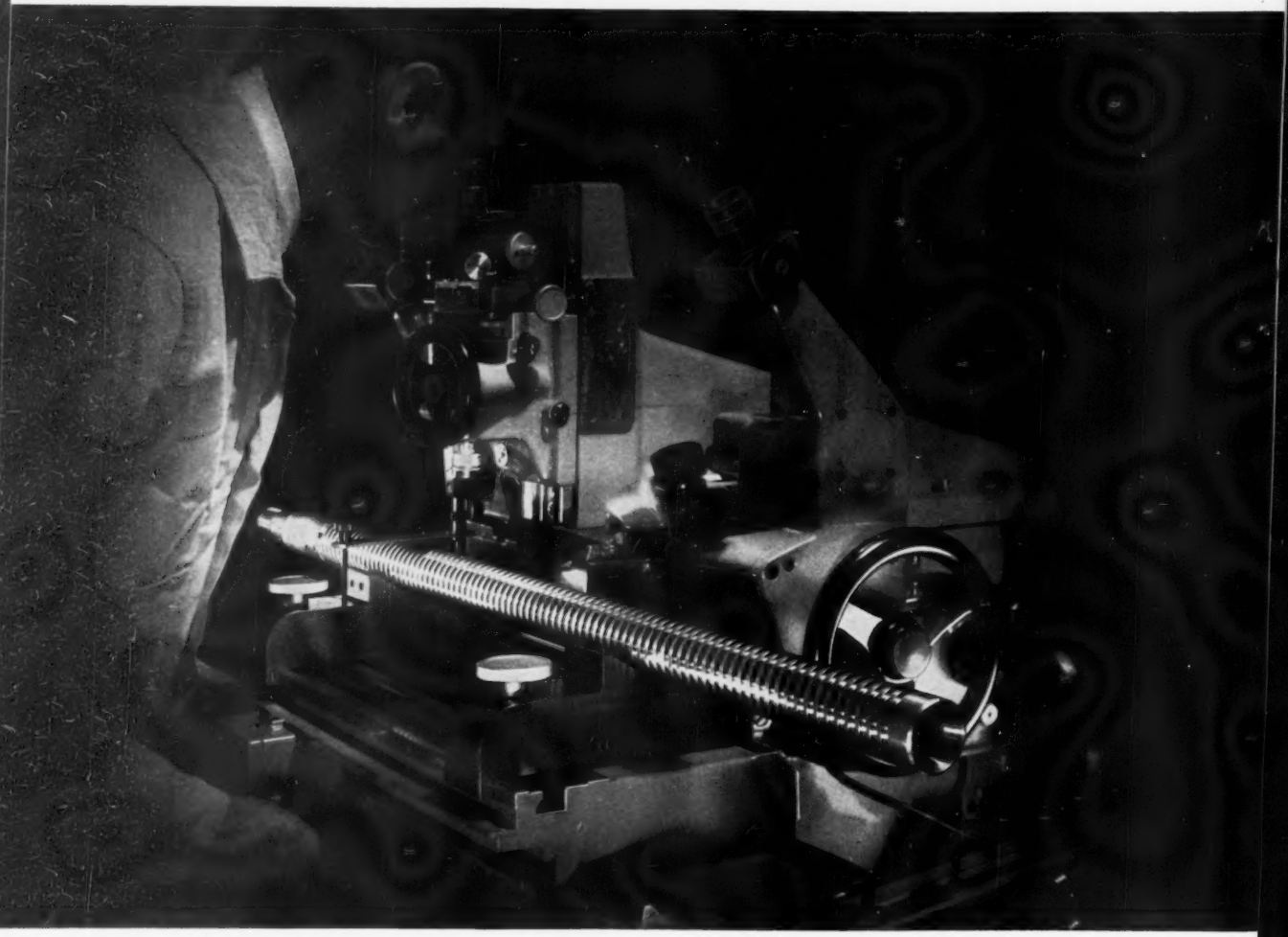
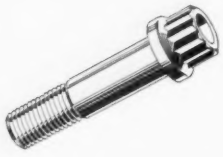
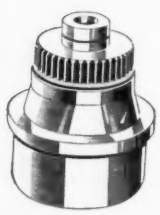


Universal machine in one of the SPS laboratories, measuring thread form and lead of screw for atomic reactor control mechanism. Optical system of this machine is capable of measurements to 10 millionths of an inch.

INDUSTRIAL FASTENERS like this UNBRAKO Socket Head Cap Screw are produced to a dynamic reliability standard as a result of SPS research. The SPS line includes a limitless variety of self-locking screws, locknuts and precision fasteners for everything from massive machinery to the most minute products.



AIRCRAFT/MISSILE FASTENERS like this bolt are produced to ultra-high performance standards at SPS. Today's lightest, strongest fasteners in standard and special designs are products of SPS. Research and development work includes titanium, beryllium and other lightweight, high-strength exotic metals.



NUCLEAR COMPONENTS like this cap for a core housing are held to almost unbelievable dimensional tolerances. The nuclear energy field depends on SPS for threaded fasteners, control rod drive mechanisms, motor tubes, core components, instrumentation housings and many other essential parts.

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SPS metrology is daily helping to raise accuracy standards for man's new frontiers in metal parts and threaded fasteners. The lab is responsible for the accuracy of $3 million worth of precision gaging throughout the international operation that is SPS today.

As a service to industry, SPS maintains three identical metrology labs—in Jenkintown, Pa., Cleveland, Ohio, and Santa Ana, Calif. At these centers, no thread fit problem is too large . . . or too small.

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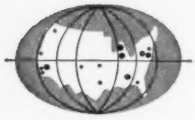

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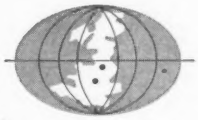
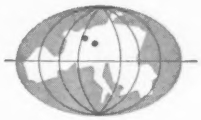
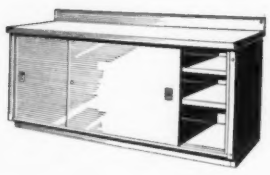




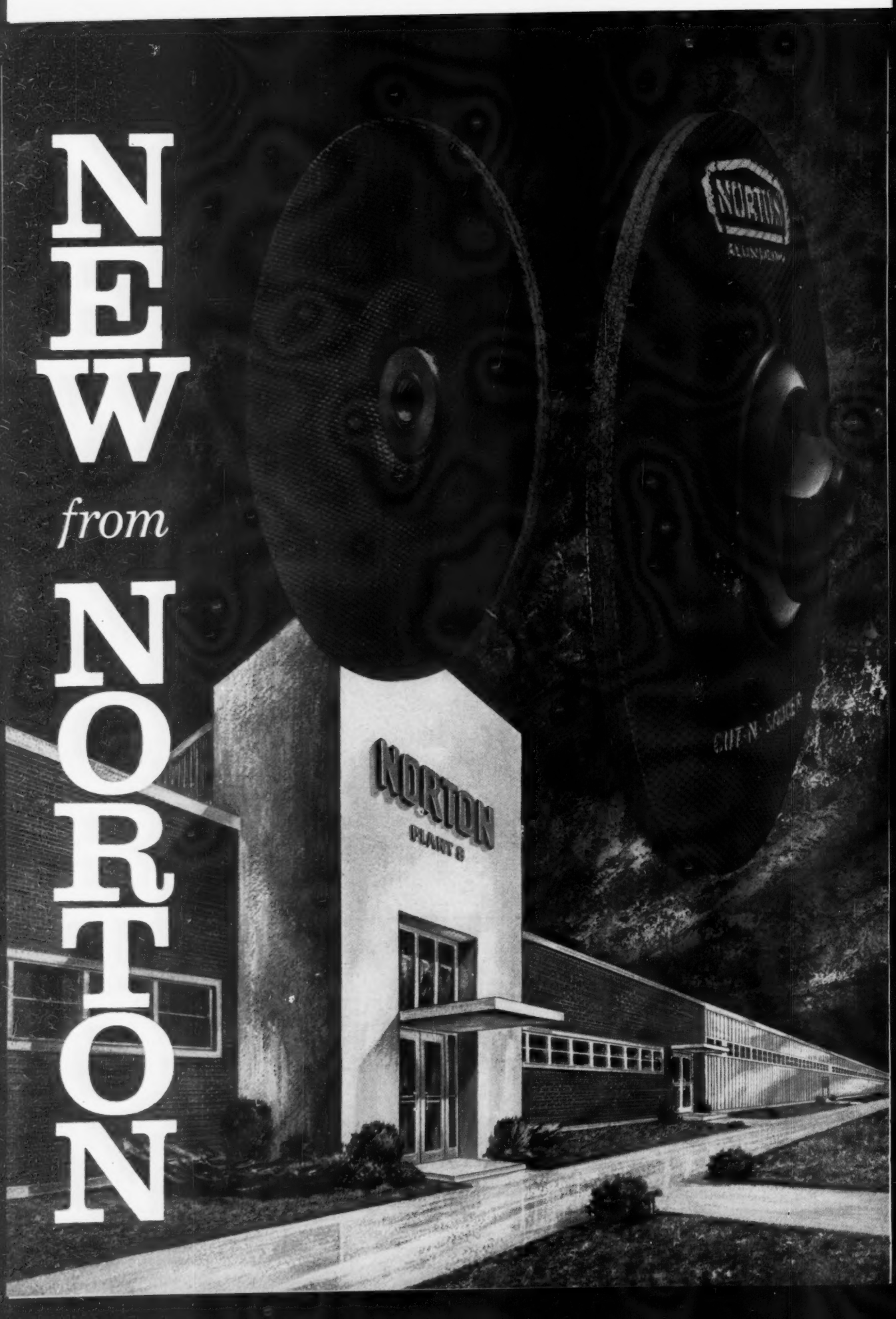
STANDARD PRESSED STEEL CO., Jenkintown, Pa., Santa Ana, Calif. • The Cleveland Cap Screw Company, Cleveland, O. • Columbia Steel Equipment Div., Fort Washington, Pa. • International Electronic Industries, Inc., Nashville, Tenn. • National Machine Products Div., Utica, Mich. • Standco Canada, Ltd., Toronto, Canada • Unbrako Socket Screw Co., Ltd., Coventry and Unbrako Steel Co., Limited, Sheffield, England • Unbrako Schrauben G.m.b.H., Dusseldorf and Koblenz, W. Germany.



SHOP EQUIPMENT for industry and schools is made to the same superior quality standards as other SPS products. The Hallowell line offers broad coverage of standard and special needs in work benches, shelving, and similar equipment. Ruggedness and space efficiency are well identified with Hallowell.

OFFICE FURNITURE like this handsome Columbia Nine-to-Five unit sets an office apart with distinctive styling and color combinations. The complete line includes efficiently designed, durable steel office furniture, plus special units, a wide choice of smart chairs, filing cabinets and accessories.

CAPACITORS FOR ELECTRONICS bearing the IEI trademark are widely used for subminiature circuitry and transistorized applications. This SPS company makes both aluminum and tantalum capacitors, including the lightest and smallest per given capacitance in the industry, to the highest quality standards.


NEW
from
NORTON
NORTON
NORTON
PLANT 8

CUT-N-SAUCER wheels with DIS-CARD mounts

A new combination from Norton's newest plant

For easier, faster weld-grinding, light snagging and many other portable grinding jobs, Norton now offers you:

The only reinforced wheels that combine a saucer shape with a disposable mount.

These are the new BSA Type Cut-N-Saucer wheels with Dis-Card mounts . . . available in 7″ and 9″ diameters. They are produced in the big new Norton Plant 8, built specifically to improve the manufacture and performance of resinoid wheels.

Reinforced with layers of fibre glass, BSA Cut-N-Saucer wheels gain added advantages from the new shape. Compared with straight wheels, BSA wheels on the job can be held at angles much closer to the horizontal. Results are easier control and reduced operator fatigue.

The Dis-Card mount is equally new and vital. Unlike ordinary mounts it is no separate attachment. It is permanently secured — designed to be bought and thrown away with every wheel. This means you can change wheels in seconds — completely eliminating "lock washer" action and the usual mounting routine that can take up to half an hour. So every Cut-N-Saucer wheel you buy is already mounted — and *stays* mounted, throughout wheel life.

Yet you pay no more for a Norton Cut-N-Saucer than for a conventional reinforced wheel!

Cash in on this first opportunity ever offered to you to get advantages never before combined in a single, standard priced, portable grinding wheel. For further facts on the new BSA wheels — or on straight wheels also with Dis-Card mounts — see your Norton Distributor, or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

NORTON
ABRASIVES

W-2017

Making better products . . . to make your products better

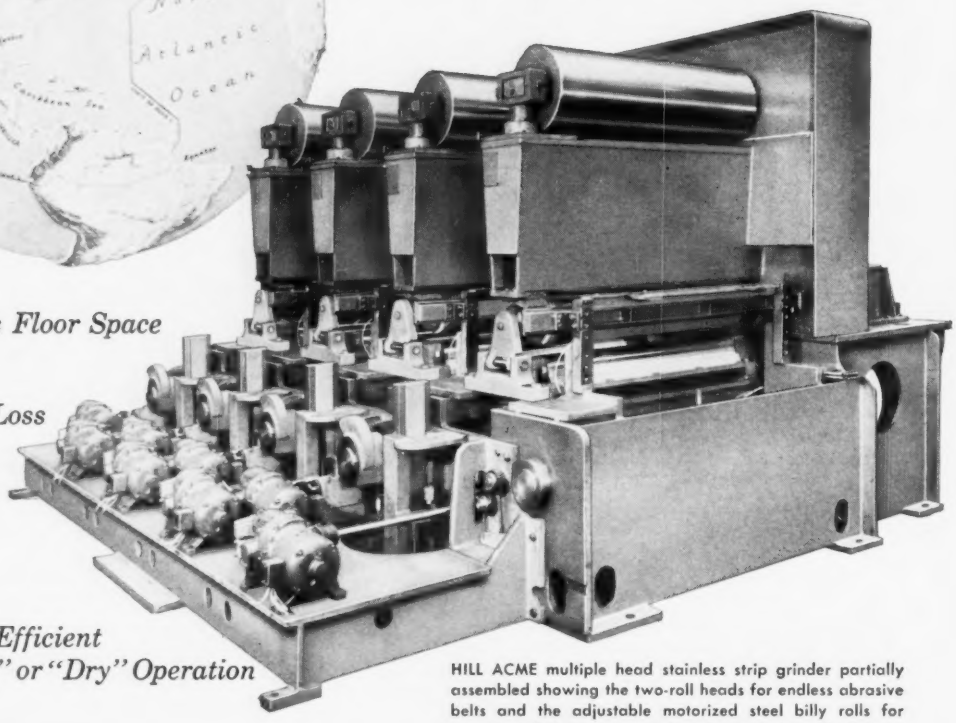
NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

WORLD'S LARGEST MULTIPLE HEAD ABRASIVE BELT GRINDER by Hill Acme Co.

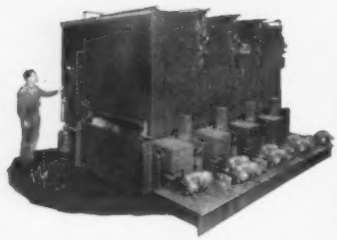
★ *Saves Floor Space*

★ *Reduces Material Loss*

★ *Equally Efficient for "Wet" or "Dry" Operation*



HILL ACME multiple head stainless strip grinder partially assembled showing the two-roll heads for endless abrasive belts and the adjustable motorized steel billy rolls for increasing belt pressure against the steel strip. The belt on any head can be changed while others are in operation.



HILL ACME four head grinding and polishing machine for the progressive finishing of stainless steel strip. This unit will process material .010" to .250" thick and 50" wide and produce up to No. 4 finish.

This four head HILL ACME abrasive belt grinding and polishing machine requires only half the floor space of four conventional strip grinders. The flexible design permits the addition of any desired number of heads.

For heavy stock removal "wet" grinding is recommended with 600 GPM coolant. Sludge passes through the bottom of the machine to the filter unit. Tests prove that considerable less coiled material is lost than in previous methods. A built-in oil mist spray system is used in polishing operations. Rubber covered guide rolls, built into the machine, create the proper "break" angle of the strip over each billy roll to flatten the strip at the point of contact with the abrasive belt. The billy rolls are actuated vertically by hydraulic power to overcome the tension on the steel strip.

This unit is the result of thirty years of success in producing endless abrasive belt grinding and polishing machines for all types of ferrous and non-ferrous materials.

Complete details are available.

The HILL ACME Company

Also Manufacturers of:

"HILL" Grinding and Polishing Machines • "ACME" Forging Machines • "CANTON" Rotary and Alligator Shears • BAR-BILLET Shears • MATERIAL HANDLING Equipment • "CLEVELAND" Knives and Shear Blades • KLING Metal Working Tools.

1201 WEST 65th ST., CLEVELAND 2, OHIO

Grade "A" down the shipping line

Few applications demand so much from a metal as those in the dairy industry. Equipment which comes in contact with milk must be completely corrosion-resistant, easy to keep hygienically clean, and practically indestructible. For years many metals were tested and today, from milk pail to bottle-filler, virtually every piece of equipment used in the handling and processing of milk is made of stainless steel.

Product reliability like this depends on uniformity of both materials and production—the reason J&L stainless is bought regularly by dairy equipment manufacturers. J&L delivers quality consistently, order after order, to help you send Grade A products down the shipping line.

Get consistent quality stainless steel from your J&L distributor, *as* you need it, *when* you need it. He can also provide technical assistance.

Stainless Steel

Jones & Laughlin Steel Corporation

STAINLESS and STRIP DIVISION • DETROIT 34

J&L STAINLESS

SHEET · STRIP · BAR · WIRE

BULLARD

THE PRICE IS LOWER !
THE PRICE IS LOWER !
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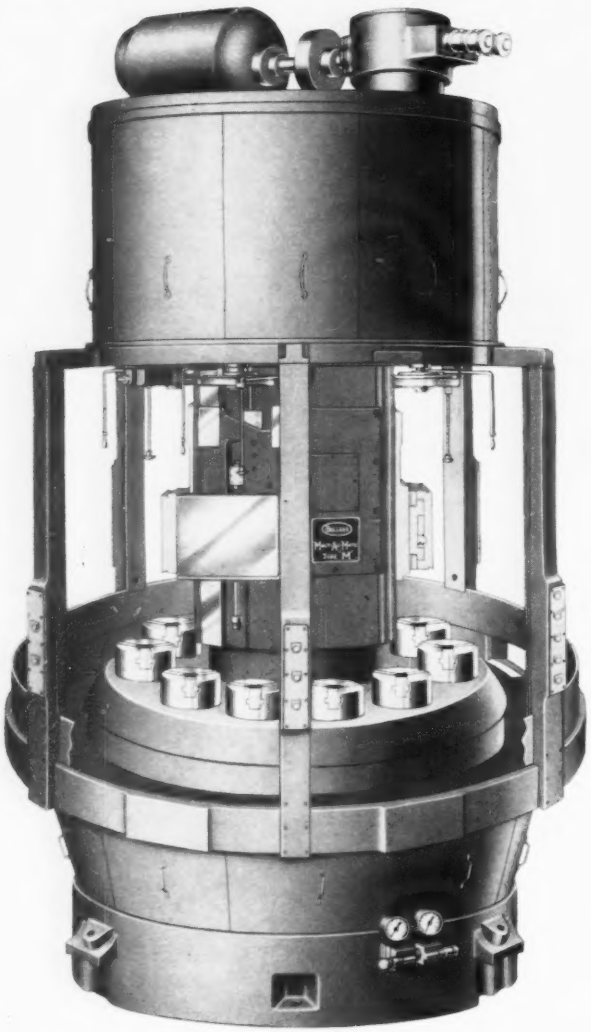


with the NEW Bullard Mult-Au-Matic Type "M"

To achieve the same production output obtainable from a Bullard Mult-Au-Matic, Type "M", competitive methods would require a greater investment of capital funds.

Built to exacting Bullard standards, the Type "M", available with 6, 8, or 12 spindles, incorporates in its design many features which insures its rigidity, accuracy, and productivity, even on difficult machining jobs.

For complete Mult-Au-Matic, Type "M" information, write for a catalog or call your nearest Bullard Sales Office or Distributor.

The Bullard Company, Bridgeport 9, Conn.

THE PRICE IS LOWER !

SAFER CLEANING FOR SENSITIVE WHITE METALS

CHLOROTHENE® NU cold-degreasing solvent is not only safe for white metals but can be used safely on *all* common metals, including aluminum and zinc, on most electric motors, instruments, and many plastics. Chlorothene NU also has all the desirable characteristics of the nonflammable chlorinated solvents *plus* less toxicity. Maximum allowable vapor concentration is a high 500 ppm compared to carbon tetrachloride at 25 ppm.

The superiority of Chlorothene NU in its resistance to fire is outstanding—it has *no* fire or flash point measurable by standard methods! This combination of low toxicity and no flash point has led to the wide use of Chlorothene NU in production and maintenance cold-degreasing operations. Effective by spray, dip, bucket, or wiping methods. Chlorothene NU specially inhibited 1,1,1-trichloroethane is easily recovered by distillation.

Use Chlorothene NU in *your* cold degreasing. Contact your distributor of Dow solvents for complete information about its safety features, uses, recovery and cost. Ask him about Dow trichloroethylene, perchloroethylene and methylene chloride, too. Or get in touch with your nearest Dow sales office.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

which type crane is right for your yard?

The answer depends on many things: Lift, reach, and mobility requirements . . . duty-cycle . . . yard lay-out . . . overall costs . . . to name just a few. Proper evaluation calls for careful study.

You can count on AMERICAN for *experienced and unbiased help* in these matters. The reason is quite simple. *Only* AMERICAN builds *all nine** basic types of yard-crane equipment. Add to this our nearly 80 years of experience, and you see why it's good judgment to call in your AMERICAN representative before you buy. Capacities 12½ tons and up.

*SELF-PROPELLED ● CRAWLER ● LOCOMOTIVE ● TRUCK-MOUNTED
PEDESTAL ● REVOLVER ● GANTRY ● DERRICKS ● BULK UNLOADERS

AMERICAN

AMERICAN HOIST
and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

SELF-PROPELLED cranes travel and work anywhere — indoors, outdoors, at scattered locations.

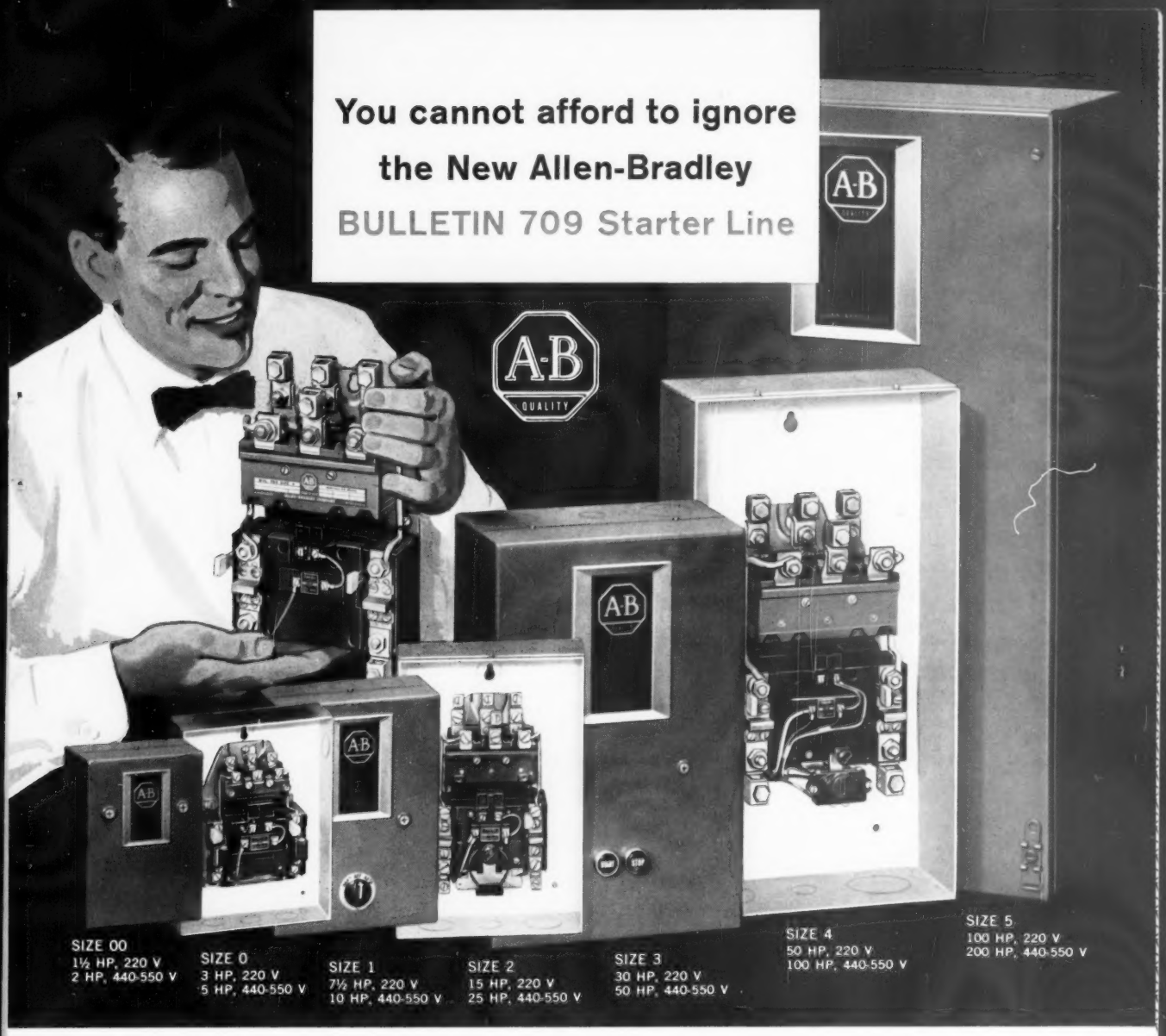
CRAWLER cranes offer high stability in unimproved yard areas . . . make tight spot turns in close quarters.

LOCOMOTIVE cranes are highly efficient for continuous, heavy-duty loading. Ability to act as a switcher facilitates car spotting for loading and unloading.

SPECIAL-PURPOSE cranes, standard or custom-engineered, are frequently your answer to lowest-cost materials handling. We offer you *unbiased* recommendations for every need.

CC-743

You cannot afford to ignore the New Allen-Bradley BULLETIN 709 Starter Line



They OUTPERFORM and OUTLAST ALL Others

These new Allen-Bradley starters bring you the greatest advance in reliability and life in all motor control history. Also, they possess a compactness that's almost unbelievable—especially in the higher ratings.

The new Bulletin 709 solenoid starters feature a patented, high-efficiency magnet, which is cushioned to reduce shock and wear. Contacts are of weld-resistant cadmium oxide silver. All coils are "pressure molded" for protection against physical damage and destructive atmospheres. The two or three solderpot overload relays are trip-free and tamperproof. Brooks Stevens, famous industrial designer, has given the new enclosures a styling that adds "eye appeal" to every installation. To get full details, contained in Publication 6100, please write today to: Allen-Bradley Co., 1316 S. Second Street, Milwaukee 4, Wisconsin.

SIZE 00 NOW AVAILABLE

Provides the same long life and reliability as others in the Bulletin 709 family. Rated 1½ HP, 220 V; 2 HP, 440-550 V.

15-61-MR

ALLEN-BRADLEY

Member of NEMA

QUALITY MOTOR CONTROL

Here Your Motor Starter Dollar Buys

MORE OF THE QUALITIES YOU NEED

BULLETIN 709 SIZE 3
across-the-line solenoid starter in Nema Type 1 enclosure.

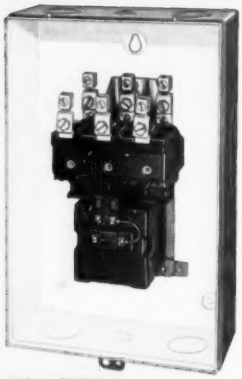
Where else could you possibly obtain—in one complete line—all of the desirable features of the ideal motor control...

1. **Smaller size**
2. **Greater reliability**
3. **Remarkable switching capacity**
4. **Longer life**
5. **Conscientious overload protection**
6. **Simpler installation**
7. **Complete accessibility**
8. **Beautiful appearance—either open or enclosed**
9. **Surprising light weight**

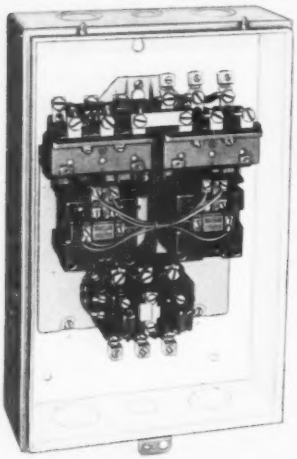
The heart of this new line of magnetic motor starters is the unique solenoid contactor. While it retains the famous A-B one-moving-part principle, it is completely new and far more efficient. This fact is reflected in reduced dimensions for all of these controls. Yet, this contactor design will perform reliably for many more *millions* of trouble free operations.

The new enclosures are very "eye appealing." When the open type starters are assembled into special panels, their neatness and compactness will delight the designers. Full details are in Publication 6100. Please write: Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

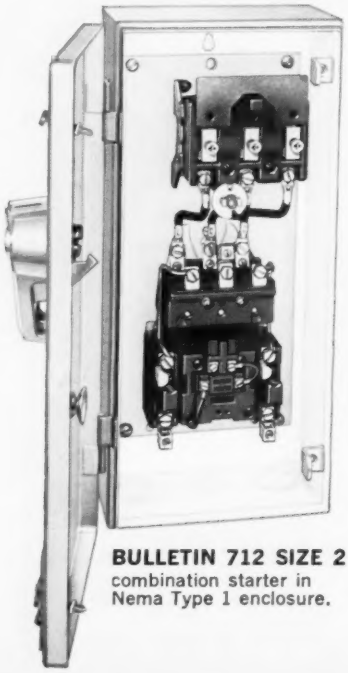
A-B QUALITY



BULLETIN 702 SIZE 3
three-pole, a-c solenoid contactor in Nema Type 1 enclosure.



BULLETIN 705 SIZE 2
across-the-line reversing starter and overload relays in Nema Type 1 enclosure.



BULLETIN 712 SIZE 2
combination starter in Nema Type 1 enclosure.

BULLETIN 715 SIZE 1
across-the-line, two-speed starter—with two overload relays per speed—in Nema Type 1 enclosure.

15-61-MR

ALLEN-BRADLEY

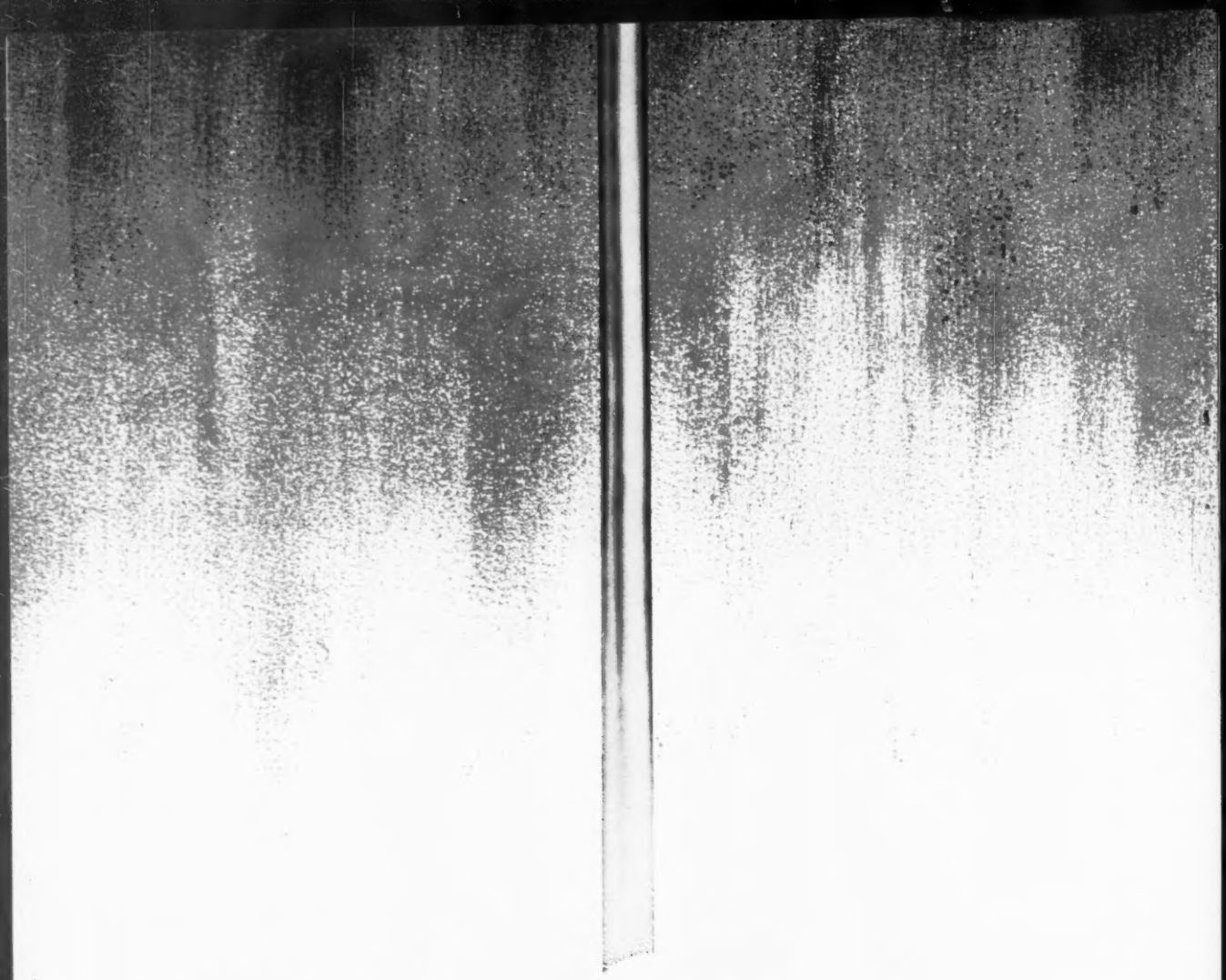
Member of NEMA

QUALITY MOTOR CONTROL

Free your roll shops for redressing and leave the finishing to us

Is roll finishing straining the profitability of your roll shop operations? Many roll users have lowered operating costs by ordering finished rolls from National, leaving their shop facilities for redressing. They've found National's modern, fully equipped roll shop economically meets all requirements for precision finishing of plain or grooved rolls. They know experienced men such as sales representatives John Patton and Bill Mason, pictured above, shoulder the responsibility for roll quality from "spec" to finishing. On your next order for steel, iron or nodular iron rolls order them finished by National. You'll see why . . . NATIONAL'S THE GROWING NAME IN ROLLS.

NATIONAL ROLL & FOUNDRY DIVISION
GENERAL STEEL INDUSTRIES, INC., Avonmore, Pennsylvania
General Steel Industries, Inc., General Offices: Granite City, Ill. Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.
Subsidiary: St. Louis Car Company, St. Louis, Mo.



OXYGEN
GOOD FOR STEELMAKING-
BAD FOR REFRACTORIES

Since the beginning of oxygen steelmaking in North America, Harbison-Walker has contributed to the success of the processes through the development of several entirely new refractories, and the improvement of others to give them longer life under the more severe conditions that accompany oxygen operations.

FOR THE BASIC OXYGEN PROCESS: Harbison-Walker developed entirely new types of refractories. These products—OXILINE H and OXILINE CL tar-bonded brick, and H-W OXIMIX—hold many production records, and are firmly established as standards of the industry. Harbison-Walker is the only manufacturer who has supplied linings to all basic oxygen process shops on the North American continent.

IN OPEN-HEARTH FURNACES: The introduction of high volumes of oxygen speeds the refining process, but also adds materially to the wear and tear on refractories. To withstand these severe conditions, Harbison-Walker developed a high purity (over 98% MgO) high density magnesite from which to produce special METALKASE refractories for the most vulnerable parts of the furnace. These new refractories will augment the present superior life of such well known products as EXKASE MAGNEX OHR, METALKASE MAGNEX H, H-W PERIKLASE and the monoliths H-W C-MIX and H-W GUNSHOT, and will continue to aid steelmakers in maintaining the high production rates that the oxygen lance makes possible.

These Harbison-Walker products, representing today's most-advanced practices, are being constantly improved through the use of better raw materials, closer quality control and continuous studies of operating experience.

HARBISON-WALKER REFRACTORIES COMPANY AND SUBSIDIARIES

GENERAL OFFICES: Pittsburgh 22, Pa.

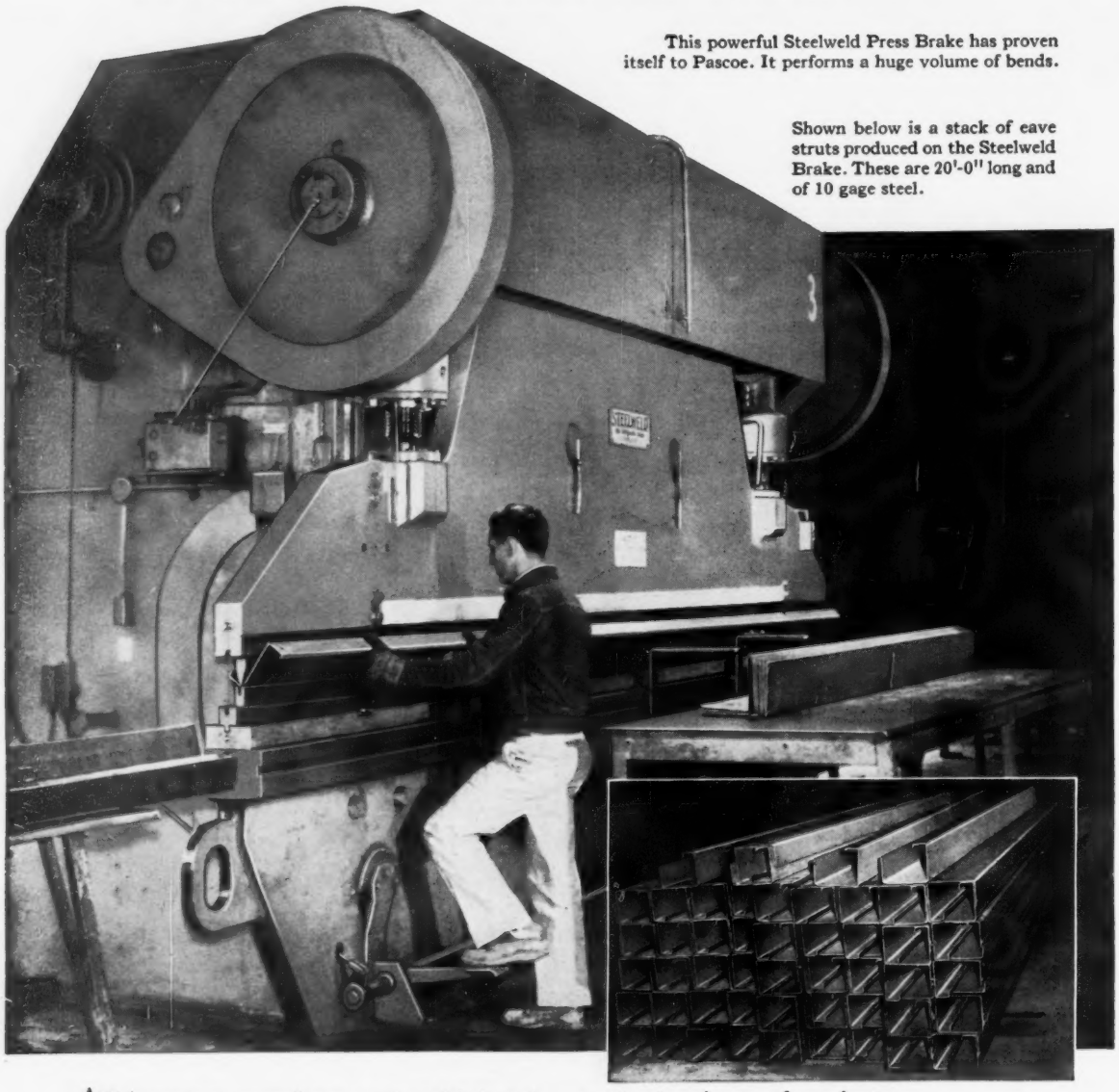
World's Most Complete Refractories Service

HW 61-24

STEELWELD BRAKE
AIDS PASCOE BUILDING PRODUCTION

This powerful Steelweld Press Brake has proven itself to Pascoe. It performs a huge volume of bends.

Shown below is a stack of eave struts produced on the Steelweld Brake. These are 20'-0" long and of 10 gage steel.



AN important manufacturer of prefabricated steel buildings on the West Coast, the Pascoe Steel Corporation, Pomona, California, keeps their Steelweld Press Brake going full tilt in order to keep up with the production schedule.

The brake normally handles steel up to 20'-0" x 3/16", although occasionally 1/4" metal is formed. It has the speed and power to produce sharp accurate bends at a fast rate.

Despite all the work put through, only the meagerest amount of maintenance is required. For instance, the clutch has had to be adjusted only once, every eight-month period and this can be done in very few minutes.

Pascoe builds a complete line of pre-engineered buildings which are used for warehouses, light manufacturing, grain storage, auditoriums, aircraft hangers, etc.

Write for free copy of catalog No. 2023A

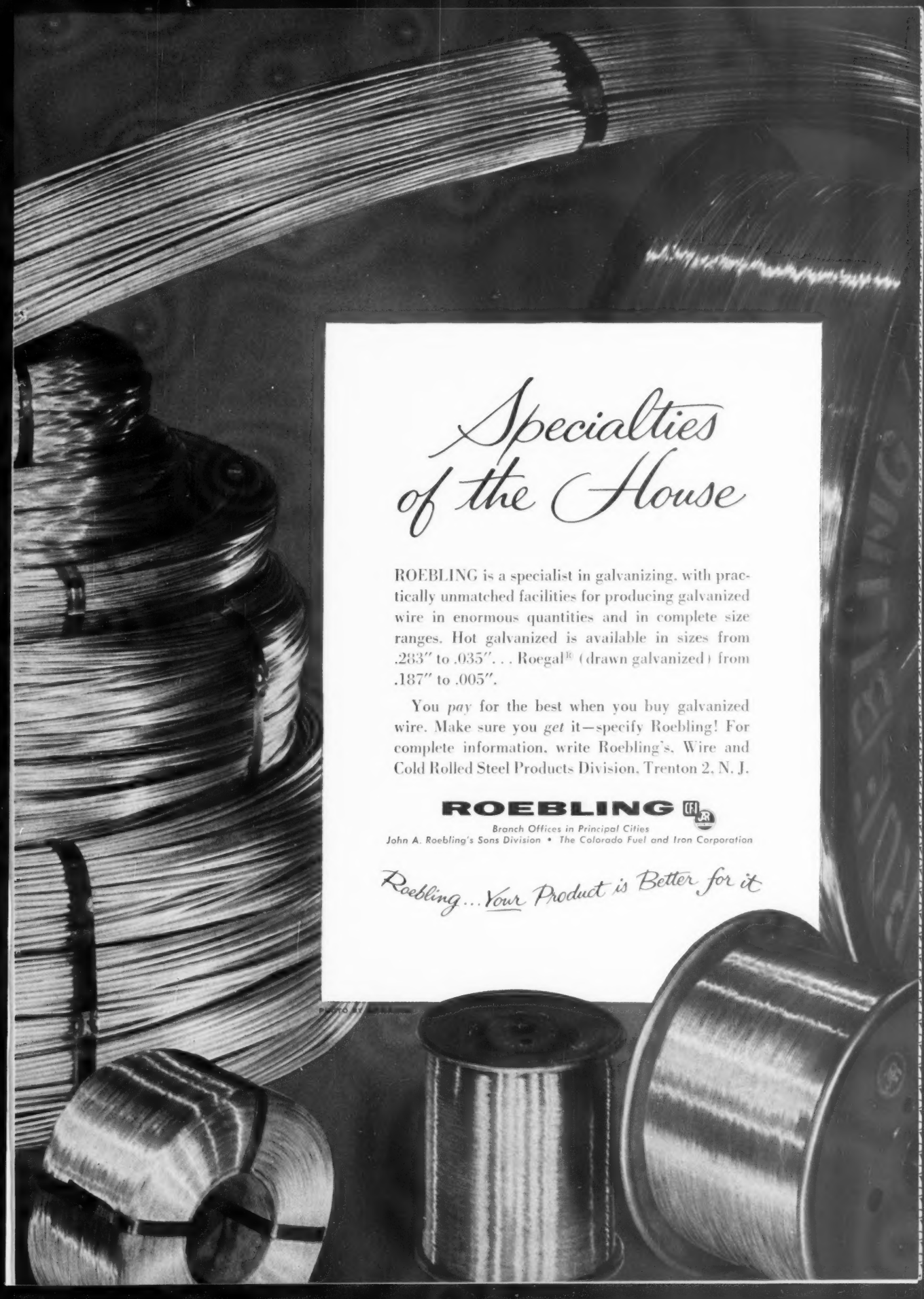
STEELWELD

Mechanical and Hydraulic

PRESS BRAKES

Steelweld Machinery includes: Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7873 E. 281 ST. • WICKLIFFE, OHIO



Specialties of the House

ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″. . . Roegal® (drawn galvanized) from .187″ to .005″.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! For complete information, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND FOUNDRY

DIVISION OF GORDON STREET, INC.

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

ANOTHER NORTON PRODUCT

The solution that saved millions

Millions of hours and dollars for the metalworking industry.

What is it? It's the Behr-Manning resin that makes possible Resinall® coated abrasive belts and discs. They speed up thousands of grinding and polishing operations; produce better results.

Behr-Manning pioneered the art of coated abrasive metalworking; helped develop machines and techniques; and still devotes more men, facilities, and resources to coated abrasive research and development than anyone else in the world . . . and brings you the quality results when and where you need them. BEHR-MANNING CO., Troy, N. Y., a division of Norton Company.

BEHR-MANNING

Abrasive Research

HOW TO SAVE

You can also gain greater speed and far greater flexibility from a major advance in control computers.

MONEY ON

Stored Logic provides these benefits, and the TRW-530 is the first control computer with Stored Logic.

COMPUTER

Stored Logic in the TRW-530 gives you economy in programming, economy in operating time, economy in memory requirements.

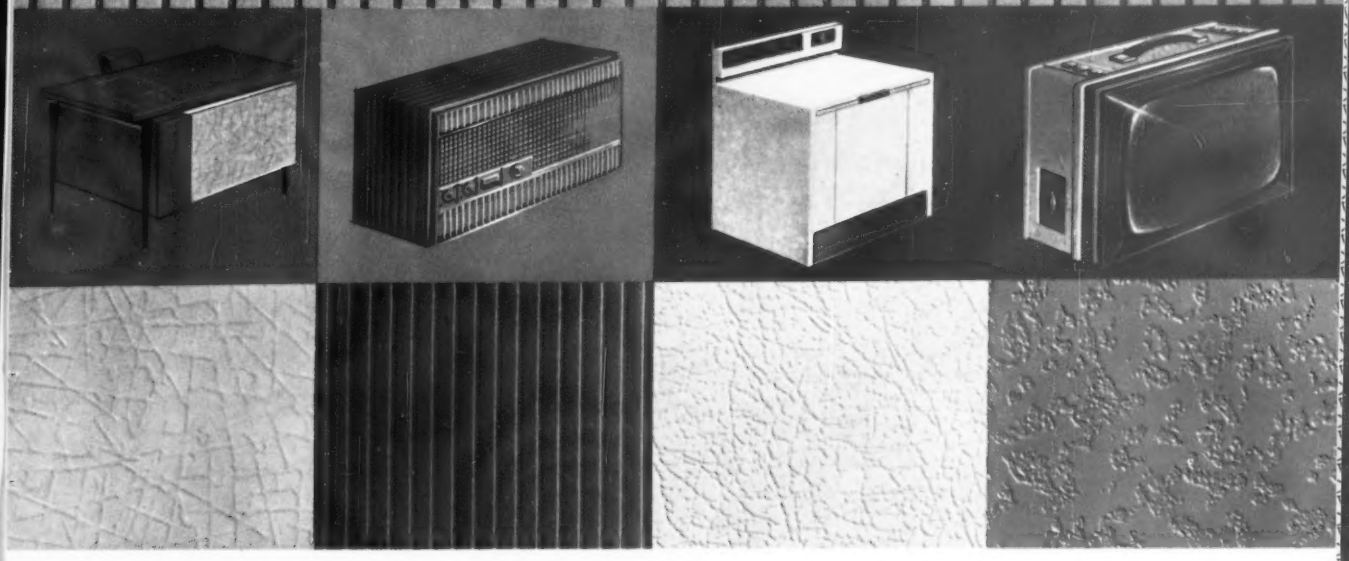
CONTROL

How can Stored Logic work for you? Our engineers will tell you why Stored Logic in the TRW-530 is the money-saving answer to control problems involving integrated control of several shops, mills, and furnaces. Contact one of our offices below.

TRW Computers Company
a division of
Thompson Ramo Wooldridge Inc.

LOS ANGELES 8433 FALLBROOK AVENUE, DIAMOND 6-6000, EXT. 2227 • **CHICAGO** 200 SOUTH MICHIGAN AVENUE, HARRISON 7-6348 • **HOUSTON** 1510 ESPERSON BUILDING, CAPITAL 7-5319 • **NEW YORK** 200 EAST 42ND STREET, MURRAY HILL 2-8488

PICK A PATTERN FOR YOUR PRODUCT FROM PITTSBURGH STEEL SHEET



Wrapper stock or drawn parts, flat panels or roll-formed fittings—whatever the application, Wide Pattern Designed Sheet gives finished products snap and sparkle that attract buyers, boost sales. Patterned Sheet—as wide as 60 inches, thicknesses from .0179 to .0897 inch—is available in commercial, drawing and AK drawing quality steel; has same fabricating properties as plain cold-rolled sheet in your processing equipment. Rolled-in designs—unlimited in range—take paint, enamel, porcelain, plated finishes. Investigate Wide Pattern Designed Sheet—steel with decorative appeal, from . . . PITTSBURGH STEEL COMPANY, Pittsburgh, Pa.

for other steel specialties turn page.

HOW "BOSTON" PROFITS FROM THOMAS NICKEL-COATED STRIP

Thomas Strip buffed nickel-coated steel strip reflects 40% saving, fewer production steps for C. Howard Hunt Pen Co.'s pace-setting "Boston" pencil sharpeners.

At Statesville, N.C., Hunt Pen blanks, embosses, pierces, spot-welds wrapper stock for sharpener cases from coils of 2 by .010-in. buffed nickel-coated steel. Firm has depended on Thomas Strip Division of Pittsburgh Steel Co. 20 years for brilliant finish. Purchasing Agent T. V. McCurdy tells why:

"We once used stainless for wrapper stock but costs skyrocketed. Thomas Strip costs 40% less, gives us handsome appearance, durability and easy fabrication of steel. It eliminates expense and headaches of plating, too.

"We're more critical of this material than any other—the slightest scratch stands out. We've never had to reject any during our long relationship with Thomas."

Hunt Pen produces more pencil sharpeners with nickel-plated strip than any other U.S. manufacturer. Assembly of "Champion" portable model is shown above.

Want to learn how Thomas Pre-Coated Strip Steel Specialties can help you? Ask, and we'll show you.

"WE GET BETTER PRODUCTS FOR LESS WITH THOMAS PRE-PAINTED STRIP," SAYS NATIONAL GYPSUM COMPANY

Tough, durable vinyl-enamel coat on Thomas Pre-Painted Strip fabricates easily as plain steel, gives a profitable boost to "Gold Bond" quality of National Gypsum Company's metal building products.

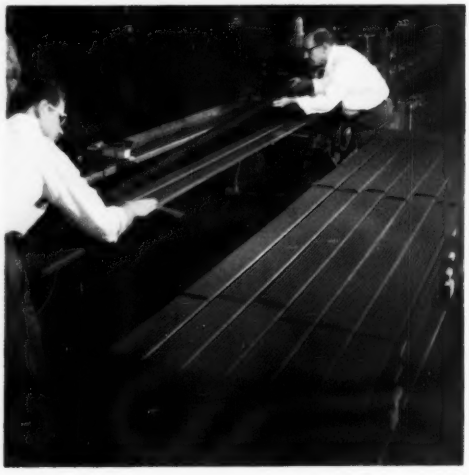
Exposed pre-finished partition bases, cornice moldings, wall trim and "J" suspension channels are roll-formed by National Gypsum Company's Niles, O., Metal Building Products plant. Coiled strip sizes range from 18 to 24 gage in widths $2\frac{17}{32}$ to $4\frac{1}{2}$-in., painted one side with white, grey or red, and wash-coated opposite side.

"Thomas Strip Pre-Painted gives us products far superior to those we got when we spray-painted after forming. It saves us 8.75 to 9.2% of production cost and reduces inventory problems," says Plant Manager D. K. Archer.

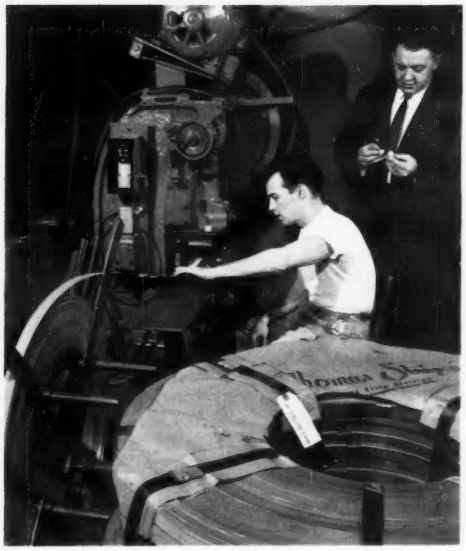
"The paint coat has better adhesion and takes roll forming without cracking or peeling. Thomas supplies us superior material of uniform, consistent quality that suits our requirements."

Photo below: roll forming 10-ft. Snap-On bases.

Eliminate your paint-line problems with Thomas Pre-Painted Strip. Let us show you how.



PITTSBURGH STEEL COMPANY



SQUEAKS, RATTLES SILENCED WITH THOMAS PLASTIC-COATED STRIP

Primary use of Thomas Plastic-Coated Steel is in decorative applications. But it performs a unique practical task for manufacturers of fine furniture.

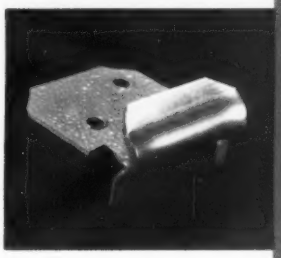
Laminated to Thomas cold-rolled strip, the plastic coating assures absolutely noiseless functioning of modern, strong steel springing.

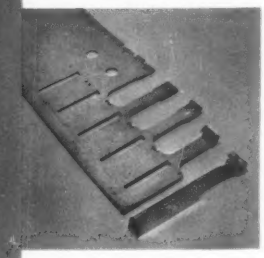
Universal Wire Spring Division of Hoover Ball & Bearing Co., Georgetown, Ky., uses Thomas Plastic-Coated Strip to make spring retainer clips that anchor its sinuous wire Uni-Torq and Uni-Flex springs to furniture frames.

"We tried applying pressure-sensitive tape to steel for this clip, but decided on Thomas Plastic-Coated. It's pre-finished and doesn't slip or peel in forming or in use," says Bernie J. Johnson, sales vice president, upholstery spring division.

"The clip acts as a pivot as well as an anchor for our engineered seating springs. Steel against steel produces squeaks and rattles. The plastic coating eliminates them—and makes an important sales point."

Decorative or functional—whatever the need, Thomas Steel Specialties will make your product better, too.





THOMAS STRIP HELPS "BUILD A BETTER MOUSETRAP"

World's biggest trapmaker, Animal Trap Co. of America, has the long-sought "better mousetrap." And Thomas Strip Copper-Coated Steel helps make it so. Rattraps, too.

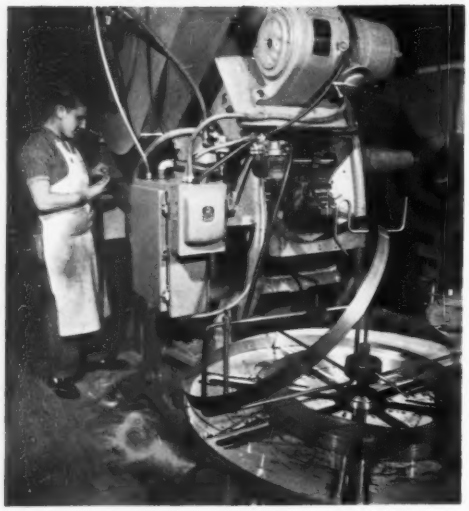
Animal Trap Co. of America, Lititz, Pa., has depended on Thomas Strip over 25 years for close tolerance copper-coated steel strip to make bait pedals, locking bars for a dozen models.

The firm produces millions yearly from Thomas electroplated stock in sizes from .4375 by .025-in. to 5 by .035-in., #2 temper. Precise tolerances, consistent temper of base steel allow long, trouble-free runs through progressive dies, automated assembly lines.

"Base steel gives strength, economy—the planished copper finish provides appearance and corrosion resistance needed to out-sell cheap foreign-made traps," says Sales Vice President D. S. Morrison.

Want the world to beat a path to your product's door? Thomas Strip plain or coated steel specialties may be what you need. Ask.

PITTSBURGH STEEL COMPANY



BRASS-COATED THOMAS STRIP SAVES FOLDING-RULE MAKER 60% IN METAL COST

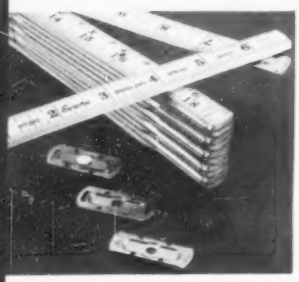
Thomas Strip Brass-Coated steel measures up to strict cost, tolerance, strength and appearance standards for Evans Rule Co. of Elizabeth, N.J., leading producer of measuring rules and tapes.

An improved type of wood folding rule—assembled with 11 patented spring joints, fabricated from Thomas electro brass-coated strip—is produced for Evans by a subsidiary—Fabrule Co.—in a fully automated plant.

For rule joints, Evans buys two sizes of Thomas brass-coated strip—1.812 and 1.562 in. wide by .012-in. thick, #3 temper, planished and oiled.

"Brass-coated strip saves us about 60% over what we'd pay for pure brass for rule joints," says John J. Evans, board chairman.

"Besides that, the base steel supplies strength to take abuse, as well as rigidity needed when the rule is opened. The brass coat provides protection against corrosion and the planished finish results in a sales boosting appearance. Physically, width and temper uniformity is critical for processing through our automated lines."



Do expensive metals hike your product cost? Inquire how Thomas Strip pre-coated steel can help you save.

The STEELMARK on a product tells you it is made of steel. Look for it when you buy.

Steel

NEW—BRUSH PATTERN DESIGN FOR THOMAS PRE-COATED STEEL

Here's a **brand new** addition to Thomas Strip Division's wide range of pre-coated and pattern designed finishes for decorative applications.

Called "Brush Pattern Design," this new Thomas Strip specialty reduces finishing costs, enhances sales appeal through its deep, lustrous, textured and buffed surface—offers products attractive "plus" that influences buying decision, moves items off the shelf.

"Brush Pattern Design" is cold-rolled strip electroplated with copper, brass, nickel or zinc coating, buffed to soft highlighted finish, protected by clear lacquer.

New Thomas Strip technique produces Brush Pattern Design Strip with uniform, nontarnishing plated coating across entire surface. Fabricates easily, without distortion of pattern finish.

Reduce your product's finishing costs, improve its appearance with Thomas Brush Pattern Design. Thomas experience, design help is yours for the asking. Call or write.

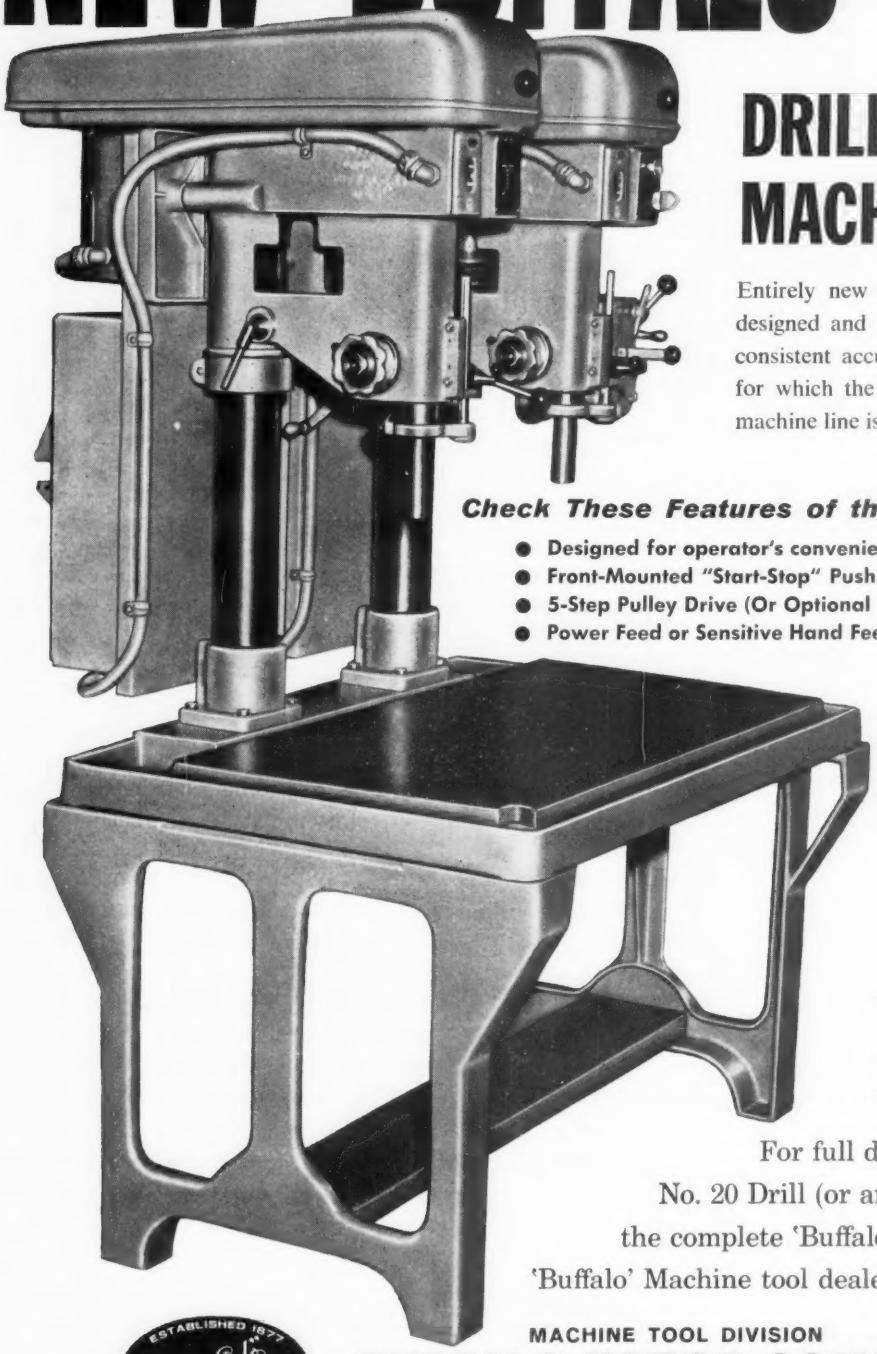
THOMAS STRIP DIVISION
PITTSBURGH STEEL COMPANY

Grant Building · Pittsburgh 30, Pennsylvania

DISTRICT SALES OFFICES

Atlanta	Chicago	Detroit	Philadelphia
	Cleveland	Houston	Pittsburgh
	Dallas	Los Angeles	Tulsa
	Dayton	New York	Warren, Ohio

NEW 'BUFFALO' NO. 20



DRILLING MACHINE

Entirely new from the ground up . . . designed and built to give you the same consistent accuracy and extended service for which the complete 'Buffalo' drilling machine line is so well known.

Check These Features of the No. 20:

- **Designed for operator's convenience.**
- **Front-Mounted "Start-Stop" Push Button Switch.**
- **5-Step Pulley Drive (Or Optional Variable Speed Drive).**
- **Power Feed or Sensitive Hand Feed.**
- **Capacity: 1" in Mild Steel.**
- **Hinged Belt Guard Speeds Belt Changing.**
- **Positive Frame-to-Column Locking Device.**
- **Hand-Adjustable Spindle Return Spring.**

Available in floor, bench and pedestal models . . . one to six spindles.

For full details on the all-new No. 20 Drill (or any other model from the complete 'Buffalo' line), contact your 'Buffalo' Machine tool dealer or write us direct.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

MACHINE TOOL DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

"For workability . . .

nothing matches Plibrico Spray-Tite"

. . . reports Patcher Foreman of large coke plant:

Plibrico Spray-Tite can be gunned in place with low rebound loss. Or trowel it in place; it's highly workable.

"We are using Plibrico Spray-Tite for patching our batteries with excellent success. No other refractory mix does so complete a job."

"We gun our oven jambs with Spray-Tite and have very little rebound. We're trowelling, too, on hot walls and this material stays workable. It doesn't back up on the trowel either."

Plibrico Spray-Tite is ideal for making repairs economically without service interruptions. Use it with wet mix or nozzle mix guns, or trowel it. It bonds well, and withstands abrasion and shock. It's one of a complete line of Plibrico refractory products.

Recommended for: **Coke oven walls, jambs, charging holes Regenerator faces • Uptake pipe seals.**

REFRACTORIES INCINERATORS ENGINEERING CONSTRUCTION

Plibrico

PLIBRICO COMPANY

1806 North Kingsbury Street, Chicago 14, Illinois

Canadian Plant: New Toronto, Ontario

Sales and Service Throughout the World

WRITE TODAY FOR LABORATORY REPORT 900-A giving complete data on properties and advantages of Plibrico Spray-Tite.

Let's Be Realistic!

One thing you learn on an extended trip through Europe is to be realistic—a characteristic abundantly lacking here in the U. S.

For example: Even though Europeans may be sitting on a powder keg, they play the game as though they were not.

Europeans react passively to the Berlin crisis. They do not think war with Russia is imminent. They point out: Russia has 50 megaton bombs, but it still can't adequately feed its people, and it is not ready to plunge into another war.

A top U. S. diplomat with long experience in Europe confirmed that evaluation for us. Europeans don't hate Russia, he said. There is no traditional hate of Russia. In fact, Europeans are sick of hate.

They are fatalistic about war. If it should come again, they would say: "So it comes! There is little we can do about it."

Europeans can't see anything wrong in trading with Russia and other members of the Communist Bloc. Moving East are finished materials and production equipment, including complete plants. Restrictions apply only to equipment that could be used directly in making military hardware.

So Europe is trading with the Communists, and it is in the midst of its greatest economic boom—one that could last ten years or longer with the unfolding of one big Common Market.

Europe is also declaring its independence, economically and technologically, from Big Brother U. S. Europe no longer looks upon American knowhow with the same reverence it did during the Marshall Plan era. It can pay its own way and contribute its share of knowhow.

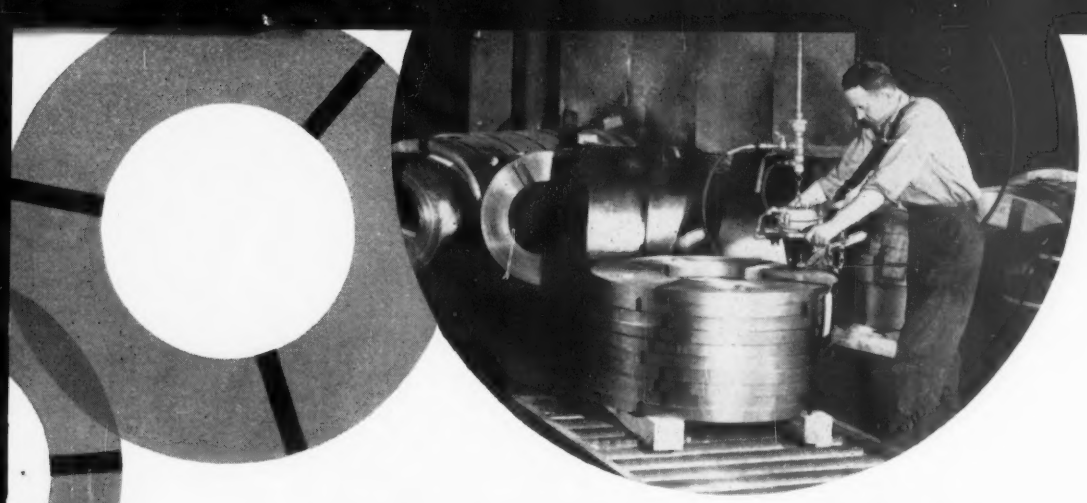
In contrast, we in the U. S. are preoccupied with the magnification of the Berlin crisis in newspaper headlines and on TV screens—while our economy vegetates, and we continue with the lush ways of a fast disappearing era.

We don't need to placate Russia, but we do need to become realistic about the changes in the world around us that will profoundly affect our lives and businesses.

It's no longer true that Europe gets pneumonia every time the U. S. sneezes.

Irwin H. Such

VICE PRESIDENT-EDITORIAL



ACME STEEL MACHINES STRAP CIRCLES AROUND ANY OTHER METHOD

In the slit coil field alone, dozens of producers are proving that Acme Steel automatic strapping systems are the most productive partner slitting equipment ever had. For instance, the new F4 Strapping Machine and Indexing Table (at left) let one man completely strap as many as 150 coils *of any width* per hour—all through push-button control. And once secured, coils are unitized just as efficiently with Acme Steel portable powered strapping tools.

Thanks to this rapid, non-stop flow, existing slitting equipment can run *continuously* at full capacity, eliminating the need for investing in additional slitting lines in many instances. No wonder Acme Steel automatic strapping equipment can pay off in 18 months!

No field has a monopoly on these savings. Acme Steel equipment is scoring unparalleled productivity gains in strapping giant hot coils, paper, textiles, products and packages of every description . . . in bundling and unitizing such products as lumber, building materials, bar stock, pipe and sheet metals.

Full facts on industry's most proven and productive strapping systems are as close as your phone. Call your Acme Idea Man for an evaluation of your particular operation. Or, clip the coupon for case studies.

ACME STEEL **IDEA LEADER IN STRAPPING**

ACME STEEL COMPANY
Dept. SBS-111, 135th & Perry Ave.
Chicago 27, Ill.

Please send me detailed information illustrating how major companies in my field use Acme Steel Strapping.

*Name*_____

*Title*_____

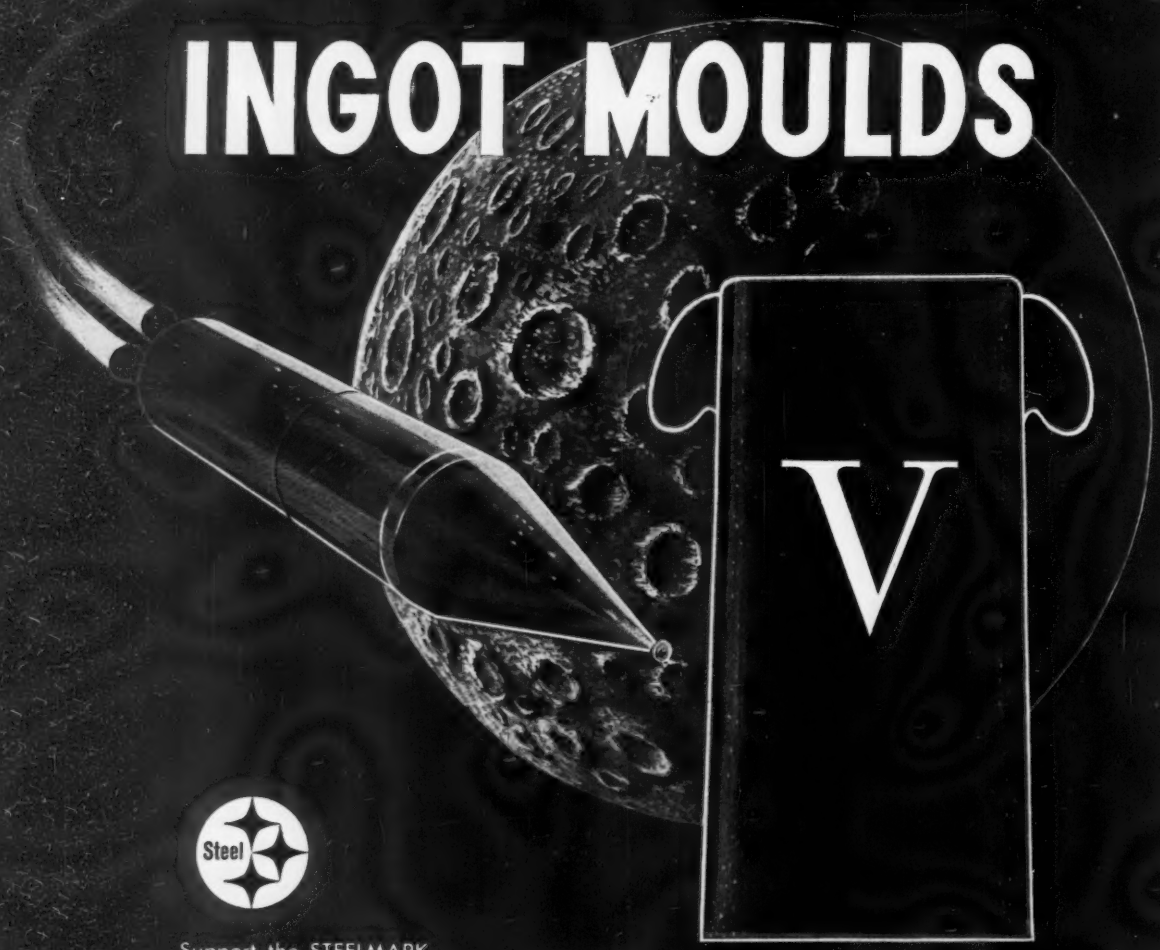
*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

For over 75 years steel has been poured into Valley Moulds, and now the new metals... used in space . . . . will also be poured into

VALLEY INGOT MOULDS

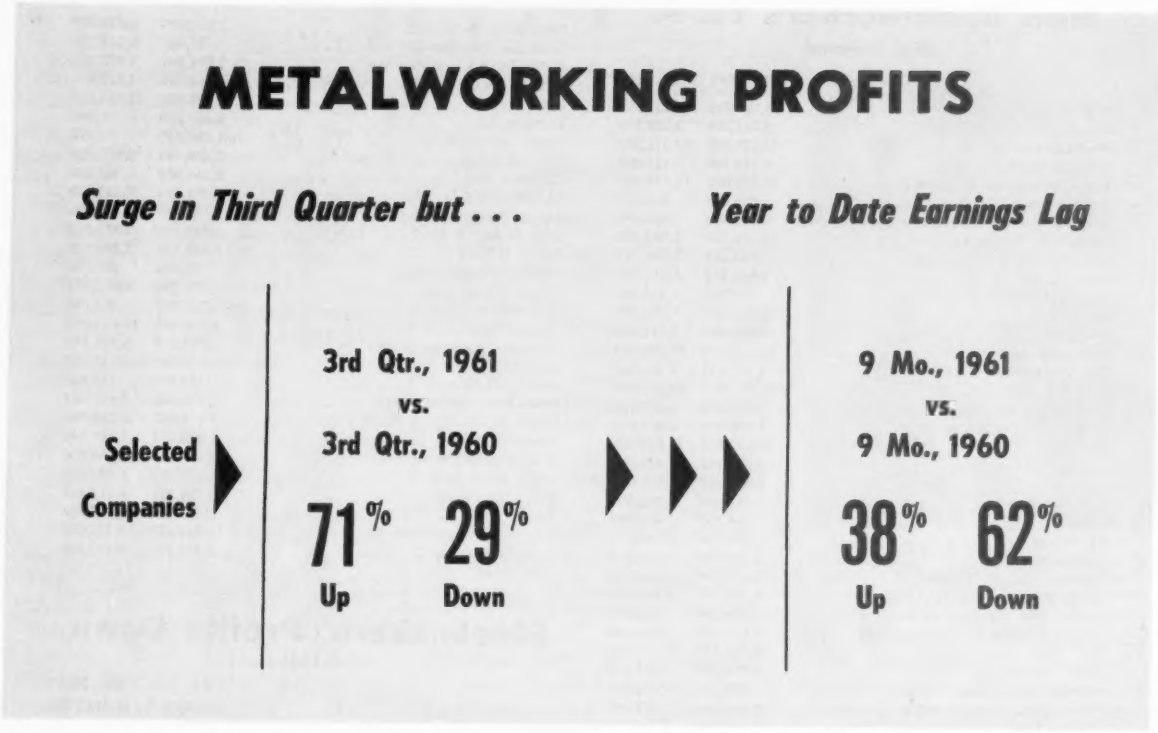


Steel

Support the STEELMARK

VALLEY MOULD AND IRON CORPORATION

GENERAL OFFICES: Hubbard, Ohio
WESTERN OFFICE: Chicago, Illinois
NORTHERN OFFICE: Cleveland, Ohio



Upturn Points to Record in 1962

METALWORKERS' PROFITS have shown a great deal of improvement since the first quarter. But further gains must be made this quarter to put this year's earnings on the same level with 1960's.

In contrast, the outlook for 1962 is heartening: Profits could hit an all-time high.

First, the nation's economists think corporate profits (before taxes) next year will jump well above the record of $46.4 billion set in 1959—perhaps as high as $56 billion. Metalworking is expected to show greater gains than other industries.

Second, new orders are continuing to rise, building up backlogs, and assuring a high level of operations for at least the first half of next year—and probably all of it.

Third, there are many indications that metalworkers are sitting on a batch of price increases, waiting for the right balance of supply and demand before they release them. Price adjustments should improve profit margins.

Fourth, defense orders should play an important part in boosting 1962 business.

Another important factor: The confidence of businessmen is stronger than it has been for many months. J. D. Wright, chairman and chief executive officer of Thompson Ramo Wooldridge Inc., declares: "Our outlook is better than it has been at any time since the first of the year. Surely, 1962 will be better than 1961."

• **'61 Margins Shrink**—Profit margins this year are likely to be slimmer than 1960's. That's why it is possible to have record metalworking sales without corresponding record profits. (STEEL estimates metalworking sales this year will be about $151 billion compared with $148.9 billion last year.) W. F. Rockwell Jr. expresses the concern of many businessmen when he says: "Rockwell Mfg. Co.'s earnings have failed to keep pace with sales growth this year because of a continuing cost-price squeeze. Because of market conditions, we are unable in most cases to increase our prices, notwithstanding increasing costs of production and distribution."

However, there is some indication that headway is being made. A significant number of the companies listed on Page 54 report a relatively greater improvement in income than in sales—some even making more while selling less.

Steelmakers are sharing in the upturn. At midyear, none of the companies for which data were

How Metalworkers Fared

(Net Income)

	9 Mo., 1961	9 Mo., 1960
Allis-Chalmers Mfg. Co.	$3,181,546	$9,031,528
American Brake Shoe Co.	2,764,789	3,599,090
American Can Co.	36,354,000	30,316,000
American Hardware Corp.	1,755,000	1,473,000
American Machine & Foundry Co.	17,622,000	16,786,000
American Metal Products Co.	565,699	544,657
American Radiator & Standard Sanitary Corp.	9,272,000	9,407,000
Babcock & Wilcox Co.	15,198,000	13,295,000
Baldwin-Lima-Hamilton Corp.	882,648	1,196,861
Bliss (E. W.) & Co.	1,840,216	1,315,947
Bliss & Laughlin Inc.	939,963	1,610,565
Budd Co.	(a)2,730,000	5,508,000
Burroughs Corp.	5,500,000	6,198,000
Caterpillar Tractor Co.	43,849,710	32,757,517
Ceco Steel Products Co.	1,593,035	1,072,161
Chrysler Corp.	(a)20,500,000	25,100,000
Clark Equipment Co.	5,815,858	5,481,135
Combustion Engineering Inc.	4,194,611	3,563,932
Continental Can Co.	30,543,000	23,748,000
Cooper-Bessemer Corp.	2,474,622	3,459,533
Crane Co.	4,337,000	3,510,000
Cutler-Hammer Inc.	3,770,884	3,955,999
Daystrom Inc.	326,457	873,000
De Vilbiss Co.	1,235,039	1,743,602
Dictaphone Corp.	1,171,000	1,144,000
Douglas Aircraft Co. Inc.	4,485,938(a)	21,868,045
Eaton Mfg. Co.	6,389,209	8,842,980
Elastic Stop Nut Corp. of America	1,218,296	985,406
Electric Autolite Co.	1,812,131	5,064,669
FMC Corp.	18,737,820	16,563,244
Fafnir Bearing Co.	3,996,736	5,991,910
Fansteel Metallurgical Corp.	831,803	1,382,949
Federal-Mogul-Bower Bearings Inc.	9,311,000	7,277,000
Gardner-Denver Co.	5,237,000	5,400,344
General Cable Corp.	4,955,280	6,343,007
General Electric Co.	150,994,000	168,935,000
General Motors Corp.	528,271,599	700,728,299
General Telephone & Electronics Corp.	49,883,000	53,221,000
Hoffman Electronics Corp.	358,623	252,431
Hoskins Mfg. Co.	872,485	951,785
Houdaille Industries Inc.	1,839,057	2,023,189
Hupp Corp.	61,000	785,000
Inland Container Co.	4,368,000	4,849,000
International Business Machines Corp.	152,887,977	119,088,057
Kawneer Co.	1,312,673	1,038,187
Link-Belt Co.	3,240,151	4,078,703
Lockheed Aircraft Corp.	16,502,000(a)	49,924,000
Mallory (P. R.) & Co.	2,801,008	2,921,212
Maytag Co.	8,436,488	7,989,731
Minneapolis-Honeywell Regulator Co.	16,312,254	18,358,826
Motor Wheel Corp.	(a)538,625	264,695
National Acme Co.	984,409	1,165,031
National Can Co.	1,847,358	1,011,996
National Cash Register Co.	13,428,864	12,179,673
Olin Mathieson Chemical Corp.	20,851,000	26,437,000
Pfaudler Permutit Inc.	1,513,000	1,469,000
Pittsburgh Forgings Co.	51,688	1,274,154
Porter (H. K.) Company Inc.	2,371,802	2,528,816
Pullman Inc.	4,614,322	9,825,434
Radio Corp. of America	23,800,000	24,100,000
Raytheon Co.	4,847,000	6,139,000
Rheem Mfg. Co.	(a)1,692,830	71,573
Robertshaw-Fulton Controls Co.	2,476,496	2,179,965
Rockwell Mfg. Co.	5,314,000	5,387,000
Rockwell-Standard Corp.	6,875,512	9,483,130
Signode Steel Strapping Co.	2,769,764	3,350,396
Simonds Saw & Steel Co.	1,969,134	2,571,762
Square D Co.	8,059,452	8,582,815
Standard Forgings Corp.	83,358	331,738
Stewart-Warner Corp.	4,570,266	4,781,574
Studebaker-Packard Corp.	(a)10,282,994	104,786
Textron Inc.	5,926,000	10,048,000
Thompson Ramo Wooldridge Inc.	3,794,356	6,858,145
Underwood Corp.	(a)6,640,000	(a)10,147,000
Union Carbide Corp.	104,570	117,427
United-Carr Fastener Corp.	1,540,065	2,631,233
United States Pipe & Foundry Co.	3,913,360	5,026,532
Warner & Swasey Co.	2,250,278	2,191,285
Westinghouse Electric Corp.	25,012,000	60,680,000
White Motor Co.	6,579,250	6,445,975
Worthington Corp.	4,105,421	5,275,648
Xerox Corp.	3,411,414	1,780,768
Youngstown Steel Door Co.	314,882	1,109,877
Zenith Radio Corp.	9,926,723	8,577,752

(a) loss.

Steelmakers' Profits Down

(Net Income)

	9 Mo., 1961	9 Mo., 1960
Alan Wood Steel Co.	(a)$490,813	$1,123,127
Allegheny Ludlum Steel Corp.	6,779,723	6,180,486
Armco Steel Corp.	37,689,605	53,427,055
Bethlehem Steel Corp.	67,910,900	93,979,141
Colorado Fuel & Iron Corp.	1,078,017	(a)3,200,729
Continental Steel Corp.	3,244,685	3,121,600
Copperweld Steel Co.	510,035	2,213,074
Crucible Steel Co. of America	963,000	1,208,432
Detroit Steel Corp.	918,811	4,307,998
Eastern Stainless Steel Corp.	1,555,182	1,313,476
Granite City Steel Co.	6,476,930	9,428,409
Inland Steel Co.	36,190,870	38,202,872
Jones & Laughlin Steel Corp.	21,929,000	29,619,000
Kaiser Steel Corp.	12,885,817	1,072,560
National Steel Corp.	23,174,117	35,362,435
Pittsburgh Steel Co.	1,199,607	1,734,154
Republic Steel Corp.	33,956,391	48,718,754
Sharon Steel Corp.	381,855	1,114,514
U. S. Steel Corp.	142,761,263	245,887,840
Universal-Cyclops Steel Corp.	2,942,190	3,658,254
Wheeling Steel Corp.	3,767,000	8,714,000
Youngstown Sheet & Tube Co.	15,989,802	21,565,636

(a) loss.

available had managed to move ahead of the year-ago profit pace, but by Oct. 1 one-fourth of them made the grade. The improvement is partly because of a steady rise in operations since the spring of 1961 and partly because we are making comparisons with the recession period in the latter half of 1960.

• **No Records for Steel**—The outlook for the steel industry is not as bullish as that for metalworking. The chances of topping the record profit year of 1957 in 1961 or 1962 are practically nil. Most industry officials would be glad to equal last year's figure in 1961, but there isn't even much likelihood of that for two reasons: 1. Sales in the fourth quarter won't measure up to levels anticipated only six weeks ago. 2. Increased wages on Oct. 1 without compensating price increases will cut profit margins. A glance at the table reveals that many steelmakers would have to have boom-type fourth quarters to bring earnings up to last year's.

Except for those producers which are heavily in construction products and tin plate, industry officials feel that income in the final quarter will continue to improve. As officials of Youngstown Sheet & Tube Co. see it, the recovery in steel demand has "lost some of its vigor" in the last few weeks, but it is temporary.

Handling Equipment Orders Rise

MATERIAL HANDING equipment builders are forecasting privately that sales in 1962 will top this year's expected $610.7 million by 10 per cent.

Industry spokesmen at the Material Handling Institute Inc.'s (MHI) meeting at White Sulphur Springs, W. Va., last week predicted that buying of lift trucks, conveyors, monorails, and related equipment would approximate $150 million this quarter vs. $145 million in the third quarter.

Material Handling Equipment Orders
(Millions of dollars)

Quarters	1961	1960	1959
First	$147.0	$150.9	$154.8
Second	168.7	173.2	193.0
Third	145.0*	140.6	137.5
Fourth	150.0*	123.5	147.6
Totals	$610.7	$588.2	$632.9

*STEEL's estimate.

• **The Spurs**—The uptrend is attributed to two factors: Increased buying by the armed services and a revival of interest on the part of industry.

Order backlogs are in the 6 to 12 week range, varying with the type of equipment.

Several companies are eying further participation in the foreign market by establishing manufacturing facilities in Europe, Africa, Latin America, and Australia. Leading lift truck and conveyor companies have had manufacturing setups abroad for several years.

• **Prices**—The price situation is described as a "shade" better than it was, but it is still highly unsatisfactory. Lift truck builders increased prices 3 per cent last spring and summer, but intense price competition persists.

Scattered increases on machine tools have inspired material handling executives to take a closer look at pricing policies.

New MHI officers: President B. E. Phillips, vice president-general manager, Industrial Truck Div., Battle Creek, Mich., Clark Equipment Co.; first vice president, Norman A. Price, executive vice president, Colson Corp., Chicago; second vice president, G. E. Seavoy, vice president, Whiting Corp., Harvey, Ill.

B. E. PHILLIPS
MHI's new president

GM-Ford Labor Pattern Spreading

SUPPLEMENTAL unemployment benefits (SUB) appeared to be the key issue as Chrysler Corp. and UAW-CIO negotiators went into final conferences last week under a 48 hour strike deadline.

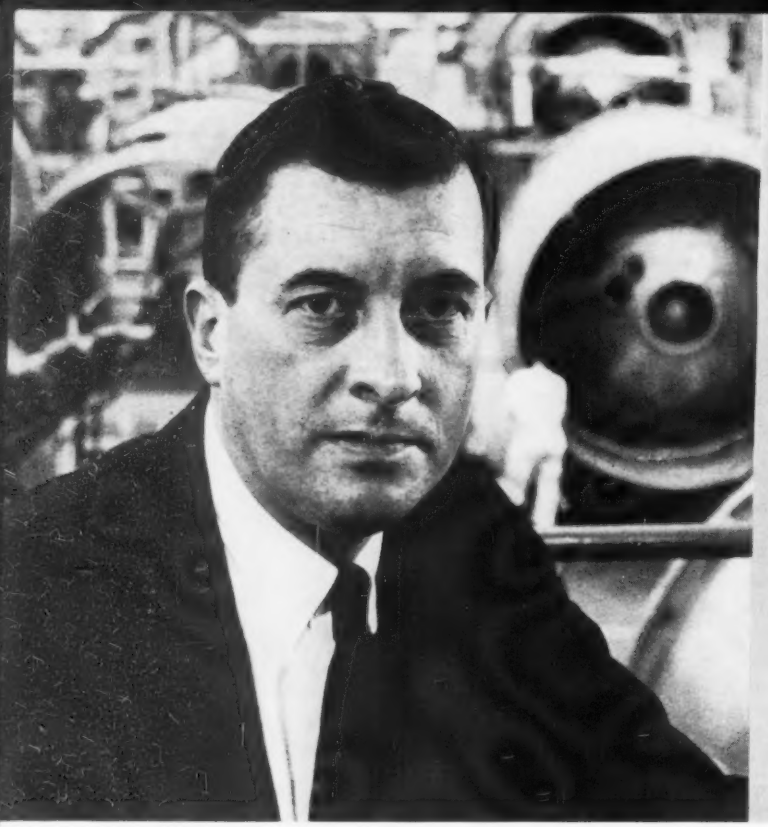
As STEEL went to press, only eight of the company's 88 bargaining units had failed to reach local agreements. Chances looked good for a settlement along Ford and GM contract lines. The Chrysler agreement reportedly included a provision that 2 cents of the first year's 6 cent wage increase would go into deficient SUB funds. The funds contain only $3.8 million, 29.8 per cent of maximum funding. Benefits would be extended to 52 weeks and $40 maximum weekly payouts.

Other bargaining problems have included changes in grievance procedures on production standard disputes and alterations in the number of company paid union representatives. Chrysler now pays for one committeeman for each 100 workers. Ford and GM have a ratio of 1 to 250 workers. Industry sources figure each committeeman costs about $7500 a year. The proposed change at Chrysler would mean at least a $500,000 annual saving.

• **Kelsey - Hayes Follows GM**—Elsewhere on the bargaining front, 3000 workers at Kelsey-Hayes Co., Detroit, accepted a three year contract following the GM-Ford pattern. The workers had been on strike for five days. The contract includes a provision permitting bumping by workers with three years or more of seniority.

• **Eaton Accepts Auto Pattern**—Eaton Mfg. Co. also reports a settlement covering 3500 workers at six plants in Michigan and Ohio. The pact follows auto industry patterns.

• **Scovill Signs**—In the nonferrous industry, Scovill Mfg. Co., Waterbury, Conn., signed a two year, UAW-CIO contract with package costs adding up to 10.2 cents, says C. P. Goss, vice president of Scovill's Metals Div. The contract expires Aug. 31, 1963. It continues cost of living and provides for a minimum wage increase of 3 cents in October, 1962. SUB has been extended to 39 weeks.



Martin Cultivates Its Brainpower

"Too many of us have been diverted into a search for the 'uncommon man' . . ."

WILLIAM B. BERGEN
President, Martin Co.

MARTIN CO., Baltimore, a division of Martin-Marietta Corp., considers every one of its 7500 engineers and scientists a creative person and has designed its organization to cultivate its greatest asset: Brainpower.

"Pressed unmercifully by the requirements of technological supremacy," says William B. Bergen, president, "too many of us have been diverted into a search for the unique 'uncommon man' who can solve all of our problems when instead we should be encouraging all of our 'indispensable men.' These are the technically trained men and women—the scientists, engineers, and technicians—upon whose creativity the nation's strength depends."

To foster creativity in producing weapon systems, Martin has . . .

- Established a scientific and technical recognition program.
- Designed special incentive systems for scientists and engineers.
- Relieved technical people as much as possible from administrative paperwork.
- Improved communications among technical personnel.
- Revised organizational relationships to keep the organization as "flat" as possible. "This would cause trouble with the organizational purists," says Mr. Bergen, "for line and staff (functions) are mixed. We concentrate on the job, not on the organization." There is no long chain of command.

Mr. Bergen believes that the most important motivation of the technical employee is personal fulfillment. Financial rewards are second.

Good working conditions are a factor, he adds.

"The greatest incentive a technical man has is to become more and more proficient in his field," he says. In support of this is Martin's scientific and technical recognition program. The program gives support, recognition, and awards for: 1. Technical papers. 2. Inventions, whether patentable or not.

- **Technical Papers**—At each geographical division of the company, a technical article awards committee reviews (quarterly) papers and oral presentations that are later published in proceedings. Each division has a top prize of $1000. There is an additional $1000 award in company-wide judging.

Chairman for the program is Welcome W. Bender, general manager for the company's Research Institute for Advanced Study (RIAS), a pure research arm of the firm. RIAS personnel do not compete in the program, but all other Martin personnel are eligible.

Any article may be considered, but it must provide a creative contribution to the technician's field. Technical editors who are communications experts are assigned to engineering groups to assist authors with papers, says Elliott H. Miller, co-ordinator for the program and a member of the company's information services staff.

Started last year as a Baltimore division pilot project, the program is now company-wide. Awards have totaled $4000 this year. In addition, communications specialists

help authors get their work published. The stature of the publication which prints a paper is also a factor in determining awards.

Moreover, Martin's public relations staff has increased its efforts to publicize company engineers and scientists. "We've found that tough technical subjects can be interpreted to qualify for general publications," says Mr. Miller. That, of course, can give the technician wider recognition for his work.

• **Invention Awards**—The program of cash awards for disclosures of merit is explained by Dr. Albert C. Hall, vice president-engineering. Inventions are reviewed by a committee soon after they are offered. Awards range from $25 to $1000, but could go higher. Dr. Hall says:

"By providing an award early, Martin Co. brings an immediate benefit to the employee and this, we believe, encourages prompt disclosure of inventions. During the first six months of this year, 158 disclosures were evaluated. Of these, 37 were determined to merit invention awards and those granted exceeded $7300."

In addition, a token award of $50 is made at the time a patent application is filed in the employee's name, and the technician is entitled to share in any profits realized from a license or sale of a patent in his name. The extent of his share is 20 per cent of the first $100,000 received by the company, 10 per cent of the next $400,000, and 5 per cent of amounts over that figure.

"We are in the business of creative engineering," says Dr. Hall. "Consequently, employees at all levels are exposed to and participate in advanced development work. We make no distinction between research and development personnel and others."

• **Face to Face Contact**—Of particular interest to President Bergen is internal communications. "Direct, informal, face to face communications can't be beat for accurate expression," he says. Worse, he opines, are the telephone call and having "to put something on paper."

Martin's new, million dollar, general office building at Baltimore's Friendship International Airport is designed to enhance personal comcommunication.

• **Other Benefits** — There is also a bonus plan for the top third of those who qualify through employee appraisals. Certain sums of money are set aside for the purpose, and an employee who earns a share one year may not the next.

"We try to treat our technicians like people," says George S. Trimble Jr., vice president-advanced programs. "There are no status symbols here. We assume our people are mature individuals. We buy them the tools they want.

"We try to win the jobs our people like to work on. The engineers we have determine the projects we get into."

New Executive Offices Have No Partitions

ALTHOUGH the office area of William B. Bergen, Martin's president, will be in a corner of the company's new headquarters building, he expects to be able to see if the executive he desires a conference with is at his desk—whether the executive is far down one of the open areaways or diagonally across a small central courtyard.

The two story, square structure has exterior walls of polished aluminum and tinted glass. Between 150 and 200 executives and staff now at the company's Middle River, Md., facilities will move in this month.

Mr. Bergen says the offices were designed to give managers the close, personal working relationship of a household or athletic team. Earlier specifications called for low railings to separate office areas. But final plans even did away with such barriers, points out Ross B. Hooker, director-facilities and real estate.

"Each floor has the same number of vice presidents," says Mr. Bergen. "There is complete freedom of movement of personnel. Even the rug is the same thickness all around.

"We want a unified corporate unit, and this will be important to all divisions. This makes the fellow down a couple of echelons feel that his work is just as important as the president's work."

Problem in aluminum industry . . .

Extruders Squeezed by Overcapacity

"FOR FAR too long a time, our industry has been concentrating on expanding capacity rather than expanding markets," says L. C. Laderer, president of the Aluminum Extruders Council and president of Wells Aluminum Corp., North Liberty, Ind.

As a result, the extruders face three problems: Overcapacity, price fighting, and low profit margins. But they see two ways out: Development of new products and development of new markets.

The U. S. has about 140 aluminum extruders, including integrated, nonintegrated, and captive shops. They operate about 375 presses. Capacity is in the neighborhood of 2.5 billion lb of soft and hard alloys a year.

• **Sales Improving**—Industry shipments hit a peak of 1.052 billion lb in 1959. This year, they are running at a rate of 1 billion lb—about 50 per cent of capacity.

William Dewar, sales manager, Harvey Aluminum Inc., Torrance, Calif., comments: Generally speaking, volume is growing. Government buying through agencies and defense contractors is putting new life into sales.

Another extruder, who also notes an improvement in sales, says that the defense buildup is boosting demand for hard alloys, and he thinks that a gradual pickup in the building industry will help sales of soft alloys all next year.

• **Overcapacity**—Despite the pickup, extruders view the future with cautious optimism. Mr. Laderer points out that the industry's capacity is still expanding (but not at the accelerated rate of 1960). Any increase must be regarded as excessive, he warns.

• **Profit Prospects**—The consensus is that profits aren't improving much and that a great deal of the gain has been earned via cost cutting.

Another development in this area should be noted: In recent weeks, prices of aluminum ingots have been reduced—2 cents a pound on unalloyed types and about 0.8 cent on alloyed.

Valley Metal Products Co., Plainwell, Mich., adds that price fighting is one of the main causes of business failures in the industry. He also singles out other problems, including contractor pressures, competition between extruders and primary metal producers who also make extrusions, and competition from low wage areas.

"Prices still are unstable," says C. C. Jones, manager of extrusion sales, Aluminum Co. of America, Pittsburgh, "although there appears to be a firming up after a period of merciless price cutting."

• **Markets** — Architectural and building products are by far the biggest market for aluminum extrusions—one large extruder reports that it accounts for 65 per cent of his company's sales. Industrial products account for 30 per cent, consumer products 5 per cent. By end products, the company's best markets are aircraft, trailers, and passenger cars.

Shipments Rise In 1961

(Millions of pounds)

1955	749
1956	765
1957	763
1958	803
1959	1,052
1960	910
1961	1,000*
1962	1,100*

Source: Bureau of the Census.
*Estimated.

Other markets include vending machines; heating, ventilating, and air conditioning equipment; electronic equipment; household appliances; furniture; shipbuilding; transmission towers; and conduit.

• **New Products** — Among recent developments are larger and more complex extrusions and improved alloys. Color is being added to the metal via anodizing rather than dyes, which are subject to fading. Comparatively new applications include an oil well drill pipe and gas transmission pipe.

Reynolds Metals Co., Richmond, Va., has announced (see STEEL, Sept. 18, p. 18) the development of an extruded aluminum underground pipe for connecting gas mains to home lines. The system eliminates the need for intermediate joints because it is fabricated in continuous coils that are 300 ft or longer.

The missile industry promises to be one of the big new markets. Ballistic quality extrusions are finding use in military vehicles and ordnance.

British Steelmakers Plan 8 Million Ton Capacity Hike

BRITAIN will increase its ingot steelmaking capacity—currently 30 million gross tons—to 38 million tons by 1965, predicts Sir Charles Goodeve, president of the Iron & Steel Institute (of London).

At a Pittsburgh press conference in connection with the Institute's tour of U. S. and Canadian steelmaking centers, Sir Charles made these observations:

1. Britain is moving toward self-sufficiency as a consumer of flat rolled steel products. Long dependent on imports for much of its supply, Britain will increase its strip capacity by 50 per cent during 1962.

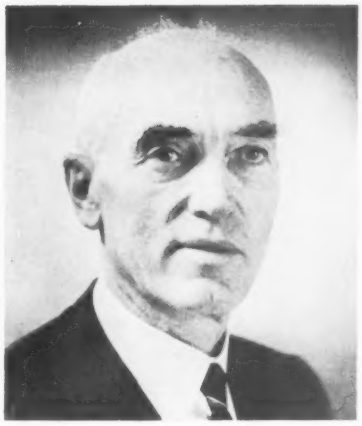
2. Technological developments of greatest interest to British steelmakers are the increasing uses of oxygen, automated controls, and continuous casting. Twelve continuous casting units are under construction in the United Kingdom.

3. British steel prices have been basically unchanged for four years, despite rising wages. Producers want government permission to raise prices, but they fear that the economic climate is against them. They're operating at about 70 per cent of capacity.

4. Steelworkers' wages in Britain are only one-third those in the U. S., but mills in this country have compensating advantages—cheaper coal, abundant natural gas, and a productivity rate that is nearly two and one-half times higher than Britain's.

5. British employers are more responsible than trade unions for the upward pressure on wages. They "pinch" workers from each other by bidding wages up. There are more jobs than qualified workers. Unemployment is only 1.3 per cent of the labor force.

6. Membership in the European Common Market is currently of more concern to most Britons than the Berlin crisis. By joining, Britain will be able to assist France, Italy, and the Benelux countries in "holding West Germany's hand." Since Russia fears retaliation from West Germany, it should welcome any arrangement that forces the Germans to yield part of their sovereignty.



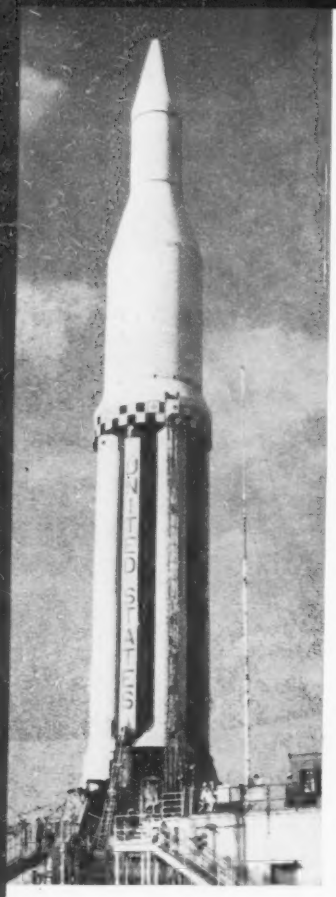
Sir Charles Goodeve

Westinghouse Finds New Power Source

AN ACCIDENTAL laboratory discovery by B. O. Austin at Westinghouse Electric Corp.'s Lima, Ohio, plant may result in a new type of thermoelectric power source. The company has been given a $75,000 contract by the U. S. Air Force's Aeronautical Systems Division to carry out research on the Austin Cell in collaboration with Battelle Memorial Institute, Columbus, Ohio.

Mr. Austin, a consultant engineer in the Aerospace Electrical Dept. of the Westinghouse plant, was engaged in a research project when he discovered that certain metals separated by a porcelain enamel produce electric power when heated. Enough electricity to drive a small electric motor and its propeller was produced by inserting thin plates in a household toaster.

Mr. Esarey predicts applications of Austin Cells in missile and space work, particularly where temperatures are so high that conventional power sources will not work.



Race for Space Superiority

THE SUCCESSFUL launch of the Saturn booster is the beginning of this nation's serious contention for space superiority. Here is what the program means to metalworking.

About 20 per cent of the Saturn's budget is going to the National Aeronautics & Space Administration and private industry. Government agencies share the remainder.

Contract awards since the middle of 1960 have included: $12.7 million, Air Force; $27.1 million, Army's Corps of Engineers; $6.2 million, Brown Engineering Co., Huntsville, Ala. (engineering and fabrication); $14.2 million, Chrysler Corp., Detroit (fabrication); $29.5 million, Douglas Aircraft Co., Santa Monica, Calif. (development of the second stage); $3 million, Flexonics Div., Maywood, Ill., Calumet & Hecla Inc. (propellent vent, pressurization, and feed lines); $10.4 million, Hayes Aircraft Corp., Birmingham (tooling, test, and ground support equipment).

Also, $1.9 million, Georgia Div., Marietta, Ga., Lockheed Aircraft Corp. (fabrication and tooling); $58.6 million, North American Aviation Inc., Los Angeles (engines); and $18.1 million, Pratt & Whitney Div., West Palm Beach, Fla., United Aircraft Corp. (upper stage engines).

Smaller contracts went to Avco Corp., Cincinnati; Bendix Corp., Detroit; Minneapolis-Honeywell Regulator Co., Minneapolis; Progressive Welder & Machine Co., Pontiac, Mich.; Redstone Machine & Tool Corp., Huntsville; and Spaco Mfg. Co. Inc., Huntsville.

Watch for a federal budget of about $91 billion for fiscal 1963, an increase of $2 billion over fiscal 1962's budget, as it was finally approved by the Congress.

The belt tightening is already apparent in at least one area: Bomber production. The extra money Congress voted this year to keep the B-52 and B-58 production lines open beyond next year will not be spent, and the B-70 and DynaSoar programs won't be speeded up.

● **MORE EX-IM BANK AID**—U. S. exporters seeking help in selling their products overseas will get it from the Export-Import Bank of Washington, says President Harold F. Linder. A new wrinkle in export financing follows earlier moves by the Ex-Im to issue short term political risk guarantees and get faster action in the medium term field by encouraging more commercial banks to get into exports.

The newest program: Twenty U. S. insurance companies have formed the Foreign Credit Insurance Association (a nonprofit group) to issue export insurance policies.

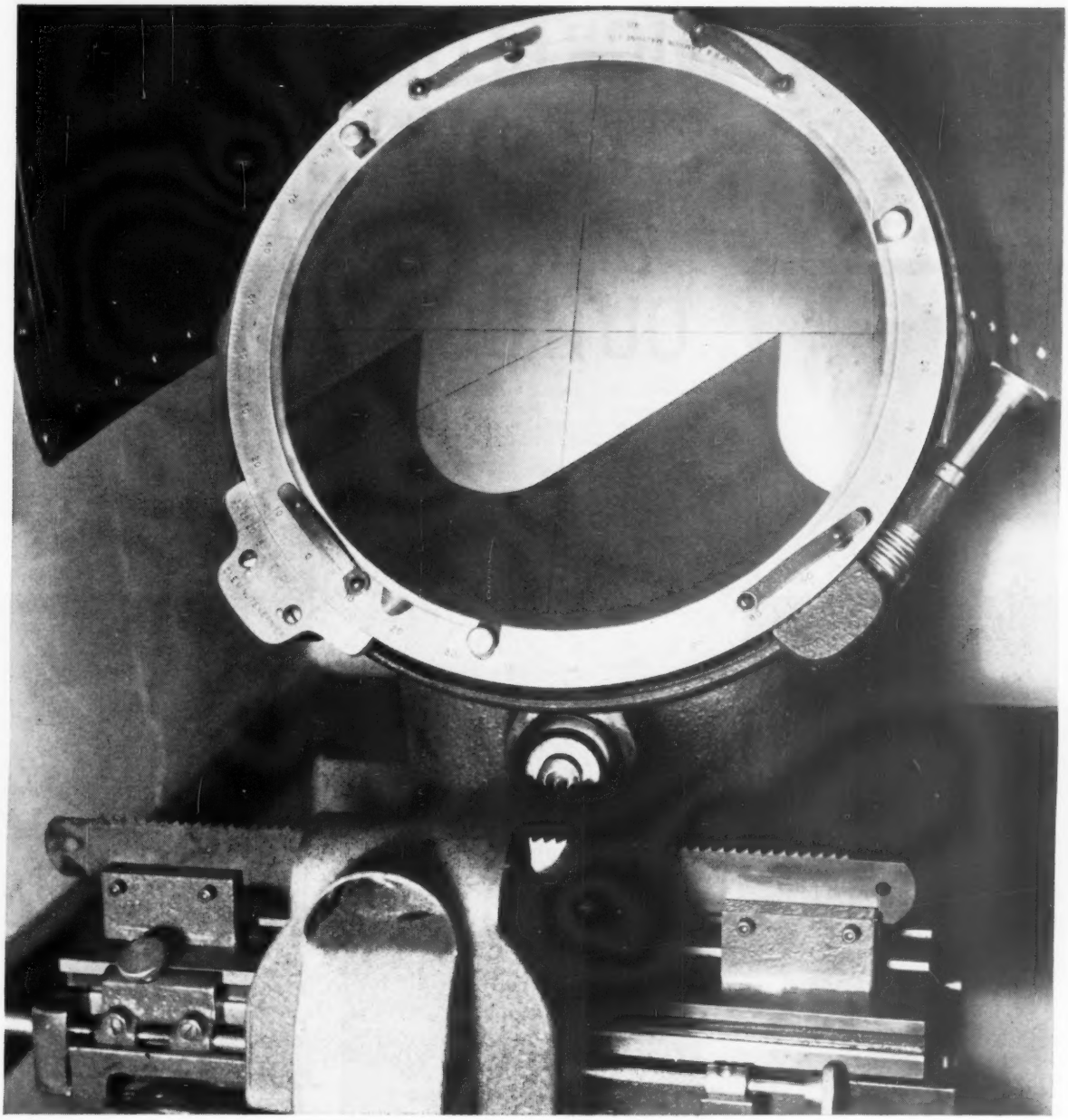
The organization is striving to get into business within two months. Members of the association will issue policies from their own offices, underwriting 100 per cent of the political, commercial, and credit risks of doing export business. In the medium term financing field, Ex-Im will offer a political risk guarantee on that part of the transaction in which a commercial bank assumes the credit risk. In addition, the cash down payment required by a foreign buyer has been cut from 20 per cent to 10 per cent, thus helping U. S. exporters meet the credit terms of their foreign competitors.

● **FEDERAL BUDGET'S IMPACT**—The President told members of his cabinet and heads of major government agencies on Oct. 26: "In view of the prospective gains in the economy, it is my intention to propose a balanced budget for fiscal 1963, barring extraordinary and unforeseen defense requirements . . . however, it is already clear that expenditures for the military and other elements of our national security programs will necessarily rise next year."

The President told his cabinet officers to tighten their belts to this extent: ". . . defer or limit increases in many programs which in more normal times would be thoroughly desirable."

Corporate planners attempting to assess the effect of the new budget on the economy next year should note Budget Director David Bell's contention: By the first quarter of calendar 1962, the net effect of the fiscal 1962 budget will be to restrain inflationary forces within the economy—he means that money will be coming into the government's coffers faster than it is going out to the public. Announcement of the close-to-balanced budget for the following fiscal year may be a depressant on the national economy, warn some economists.

But Mr. Bell believes that the recovery will not be aborted, primarily because of increasing defense expenditures and a continuing policy of relative monetary ease by the Federal Reserve Board. Other administration sources add: Although the recovery may not be aborted, we certainly won't have anything like full employment next year.



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The best way to test the superiority of a Nicholson or Black Diamond blade is, of course, use. Fit one into your saw and try it. You'll know. It's the finest blade made.

But—one of the reasons for that superb performance is the Micro-Photo Quality Control Test (above). It permits constant checks on tooth formation, cant and degree of coarseness in Nicholson and Black Diamond hand hacksaw, power hacksaw and band saw blades.

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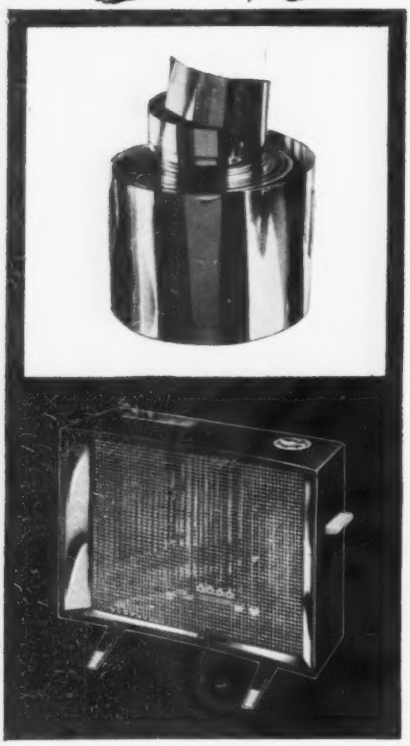
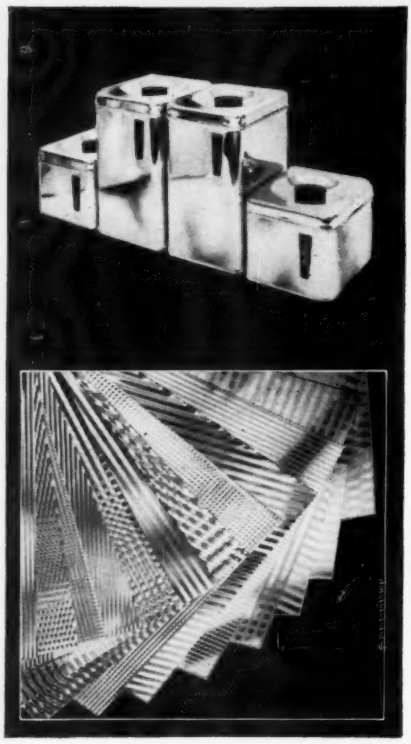
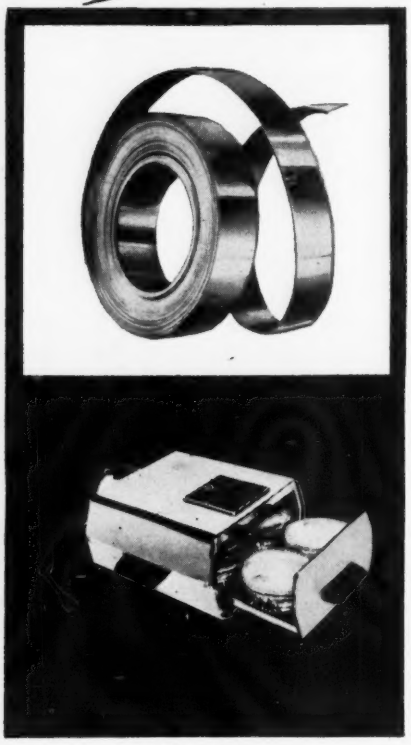


HEATER

CANISTER SET





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All who design, style, or manufacture will want to learn more about these versatile metals . . . will want to build a file of product information on the materials comprising the Nickeloid family of pre-finished metals. The data will include specifications and fabrication information. Metal samples for inspection are supplied for your file. Larger working samples for testing or for mockups will be supplied when details of the proposed use are furnished. A sales engineer will be glad to show you exciting new applications, to discuss metallurgical or fabrication problems, to help you develop cost comparisons. A letter will bring complete details.

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Selling to Government

For Profit Growth

How Government Buying Mounts

(Billions of dollars)

	1950	1955	1960	1963
Federal, State & Local . .	$39.0	$75.6	$100.1	$126.0
Federal	19.3	45.3	52.9	67.5
State	4.9	7.8	13.3	16.4
Local	14.8	22.5	33.9	42.1

Source: Office of Business Economics, Commerce Department, and Council of Economic Advisers.

IF YOU ARE NOT selling goods and services to the government, you are overlooking a growth market which amounts to 20 per cent of our gross national product (GNP). In 1950, for example, the figure was down around 14 per cent.

Spending for national defense accounts for almost half the government market, but in the other half you'll find every metalworking product available. In 1960, the states bought $296 million worth of capital equipment; local governments, $896 million.

• **Local Growth** — The Advisory Commission on Intergovernmental Relations, Washington, reports that local government needs are increasing rapidly. In the last decade, expenditures have increased an average of almost 9 per cent a year. Reason: The nation's population is increasing and concentrating in urban areas. The role of government services is also widening. By 1970, local government spending will rise to $53 billion (in terms of 1961 dollars), predicts the commission.

Metalworking's market can be seen in this partial breakdown of local government spending in 1960: Highways, almost 10 per cent; sanitation, more than 5 per cent; housing and redevelopment, almost 3 per cent. A large part of the education dollar goes into school construction, furniture, instruments, and other supplies. Local government spending varies from $282 per year per capita in New York to $85 in North Carolina.

• **State Spending**—Capital outlays (including construction, land, and equipment) of states range from $1.8 billion a year in New York to $29 million in Alaska. State governments spend $6.1 billion of their money on highway construction, receive $2.9 billion from the federal government.

In turn, states pass on $1.2 billion to local governments for streets and highways.

• **Federal Market** — Metalworkers can look forward to an acceleration in federal spending in all areas. Defense markets for new weapons of

How to Sell . . .

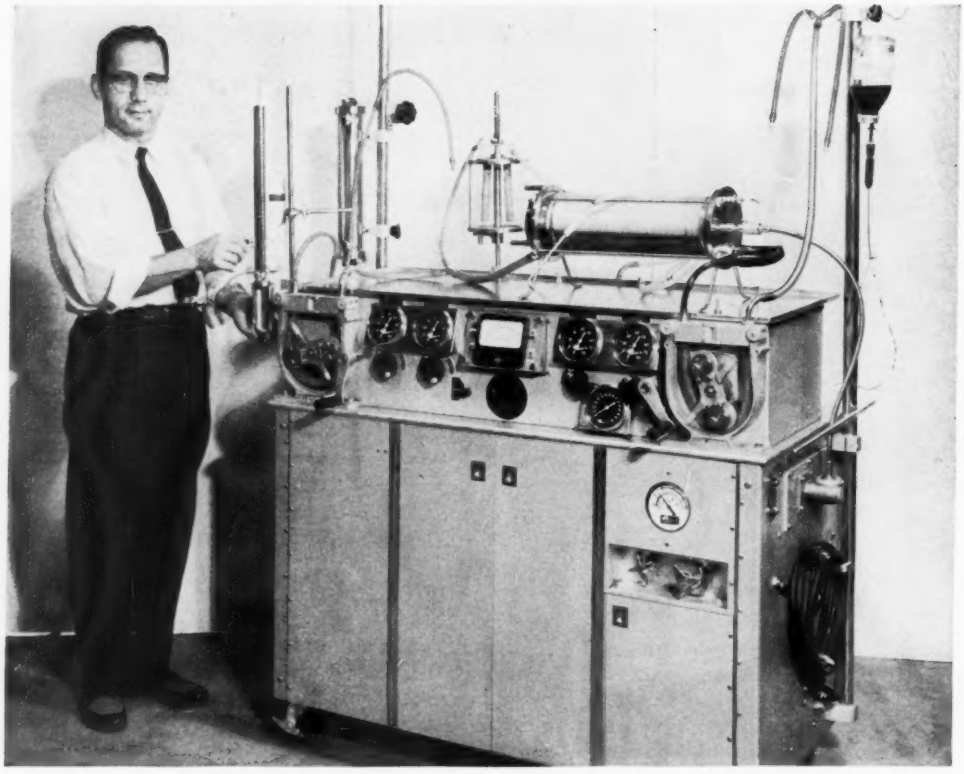
PEMCO INC., Cleveland, is having an excellent year. One reason: Its government business is double what is was in 1960.

Although the company has only 50 employees, it sells to government on federal, state, and local levels. Furthermore, its customers range from hospitals to defense contractors.

Pemco is essentially a jobbing machine shop, specializing in prototype machinery, tools, jigs, and fixtures. Its hospital business comes from a proprietary product, a heart lung unit used in open-heart surgery. Other current government projects include construction of an ion engine for NASA as a prime contractor and plasma jet and vacuum work as a subcontractor.

William Koteles, president, and George Mittermiller, supervisor of the company's instrument section, handle most of the selling to the government. Mr. Mittermiller once spent a lot of time beating the bushes for such business, but he now finds that much of it seeks Pemco. "Reputation is everything in selling the special jobs that we get," he says. "We have gradually built up that reputation," adds Mr. Koteles.

How do you market to government? Pemco's formula:



- **Be unique:** Its heart lung machine is the only one of its kind.
- **Take tough jobs:** It makes tubes for the Saturn fuel system —they were so difficult to fabricate that other companies (even NASA) turned the job down.
- **Offer a wide range of specialty skills:** That helps you to be unique—and helps you get the difficult jobs. Several Pemco employees, including Messrs. Koteles and Mittermiller, formerly worked for the National Aeronautics & Space Administration. They have diversified training as technicians.
- **Be small:** Size keeps Pemco's overhead down and helps in bidding. The company is often the smallest firm bidding on government jobs.
- **Concentrate on subcontracts:** They usually involve fewer head-

aches than primes. In prime contracting, bid chiefly on those jobs which have a minimum of subcontracting.

- **Be meticulous with records:** Few factors dampen opportunities for future work more than the failure to pass an audit—either as a prime or sub. Pemco has been audited three times in the last few years and has passed all the tests.

Mr. Koteles likes government work because it results in orders commensurate with Pemco's size, because it provides the great variety for which the company is equipped, and because it is good business—the government's credit is excellent.

Of course, not all is serene. Government payments are slower than those in commercial business, so you need higher capitalization. Complex bidding procedures make it more expensive to sell to the government than to industry. Also, legal and other considerations lead government buyers to go strictly on the lowest bid too often, sometimes with little regard to the low bidder's capabilities.

But on balance, Mr. Koteles believes that government volume is highly satisfactory. In fact, this fall he went abroad to seek foreign government business for the heart lung machine. One of his prospects: Romania.

advanced design will continue to broaden as the military takes advantage of new technology; the tempo of conventional weapon procurement has been quickened under the Kennedy administration to help us stamp out brushfire wars before they spread into an atomic holocaust. A $50 billion defense budget, including our Military Assistance Program to friends overseas, can be expected in the fiscal 1963 budget which President Kennedy will submit next January. The emphasis on conventional warfare will be continued: Orders for rifles, personnel carriers, torpedoes, landing craft, and air transport will mushroom next year. (See STEEL's series on Growing Opportunities in Defense: Aug. 21, p. 29; Sept. 11, p. 59; Oct. 2, p. 24; and Oct. 30, p. 29.)

Outside the defense area, the federal government spent $8 billion in 1960 vs. $5 billion in 1950. Our space program can be counted on to spearhead rapid gains in nondefense spending: What was first conceived as a $20 billion, ten year race to the moon with the Russians may well amount to a $40 billion effort. The Atomic Energy Commission program continues to roll along at a $2 billion a year pace. A $1 billion program in oceanography has just started.

Any day's issue of the Commerce Department's *Commerce Business Daily* mirrors the extent of federal government buying of metalworking products. (The paper lists proposed procurements, sales, and contract awards; you may subscribe to it for $10 a year through any Commerce Department Field Service Office.)

One issue noted these proposed procurements: Wire and ovens for the Army; bolts, screws, and boilers for the Air Force; x-ray machines, cranes, and cable for the Navy; electronics equipment for the North Atlantic Treaty Alliance; motors for the Weather Bureau; grinders for the Bureau of Public Roads; a temperature-humidity chamber for the National Aeronautics & Space Administration; trucks for the General Services Administration; kitchen sinks for the Health, Education & Welfare Department; and snowplows for the Federal Aviation Agency. All procurements exceeding $10,000 are listed in the publication.

- **How to Do Business** — Federal procurement is generally divided into three categories: The military departments, the General Services Administration (GSA), and other civil agencies.

Military: "How to Sell to Agencies Within the Department of Defense" is available from the Government Printing Office (GPO), Washington 25, D. C. The Army buys through its seven technical services; the Navy has 13 buying control points; the Air Force has 18 procurement districts.

GSA: You should go to the General Services Administration's 13 regional offices and Business Service Centers to contact the three procurement services of the GSA: Public Buildings Service, Federal Supply Service, and Defense Materials Service.

The Public Buildings Service maintains and repairs government buildings, leases real property, and contracts for the design and construction of new buildings. The Defense Materials Service buys for the Strategic & Critical Materials Stockpile upon advice of the Office of Emergency Planning.

GSA's Federal Supply Service is responsible for supplying common item needs to all government agencies: For example, office supplies and equipment, lighting fixtures and lamps, refrigerators, air conditioners, water coolers, motor vehicles and parts, and typewriters. About 9000 common items are bought and stocked in GSA depots for distribution to federal agencies. Another 50,000 items are purchased on term contracts executed by the National Buying Division of the Federal Supply Service.

Prospective suppliers to GSA are advised to: 1. Contact the nearest Business Service Center. 2. Know what GSA normally buys by obtaining copies of specifications and stock catalogs. 3. Consult the *Commerce Business Daily*. 4. Get on GSA bidders mailing lists.

Other Federal Agencies: There is no uniform procedure businessmen can follow to insure bringing their products to the attention of all federal agencies. The best thing to do is to submit Standard Form 129, "Bidders Mailing List Application," to the central or field offices of the agencies you are interested in. All agencies use one or more of five ways in making their needs known: 1. Distribution of "Invitations to Bid" to known suppliers. 2. Use of business magazine or directory mailing lists. 3. Publication of the proposed procurement in the *Commerce Business Daily*. 4. Public posting of "Invitations to Bid" or advertising in newspapers or business magazines. 5. Distribution of the "U. S. Government Purchasing & Specifications Directory" (available from the GPO), which lists many prod-

John Horne Sees That More Business Is Set Aside for Small Firms

PROTECTING the interests of small firms wishing to do business with the federal government is one of John E. Horne's main jobs. The new administrator of the Small Business Administration, long the administrative assistant to Sen. John Sparkman (D., Ala.) small business protagonist on Capitol Hill, is carrying out President Kennedy's directive to increase small business' share of the government pie by 10 per cent this year. He told STEEL he would be seeking another 10 per cent increase next year. Mr. Horne's chief aide on procurement, Deputy Administrator Irving Maness, is in daily contact with all federal agencies to get more vigorous interpretations of procurement regulations on subcontracting and small business setasides.

Here are examples of small companies sharing in the government procurement programs—and doing a good job.

1. An Ohio prime had exceptionally high standards for electronic equipment cabinets. SBA found five firms capable of doing the work—after visiting 100. The prime was extremely pleased with first results and is negotiating a large follow-on contract with one of the small companies.

2. A small Kansas manufacturer in the light metals field was shown the procurement ropes by the SBA at the local Air Force base. He landed four contracts totaling $20,000 and has been able to purchase additional machinery to help him to compete better for more Air Force work.

3. In Texas, a prime without previous experience in producing bomb trailer assemblies awarded $105,000 in subcontracts to small companies with various specialties.

4. GSA had turned down a small firm for a production contract on almost 2000 steel storage cabinets. SBA reviewed the company's facilities, granted a Certificate of Competency (COC), and GSA has since awarded follow-on contracts.

ucts, the agencies using them, and agency purchasing office addresses.

Warning: If you get yourself on a bidders' list once, you have no assurance of being contacted for future procurements unless you keep your name in front of the buying agency by bidding on all procurements in your field. Personal contact with the agency is always a good procedure to follow.

Which government agencies buy outside their normal, GSA, common item procurements? Examples: Atomic Energy Commission, Agriculture Department, Maritime Administration, Weather Bureau, Coast & Geodetic Survey, National Bureau of Standards, Geological Survey, Bureau of Reclamation, Bureau of Mines, Bureau of Prisons, Post Office Department, and the Veterans' Administration.

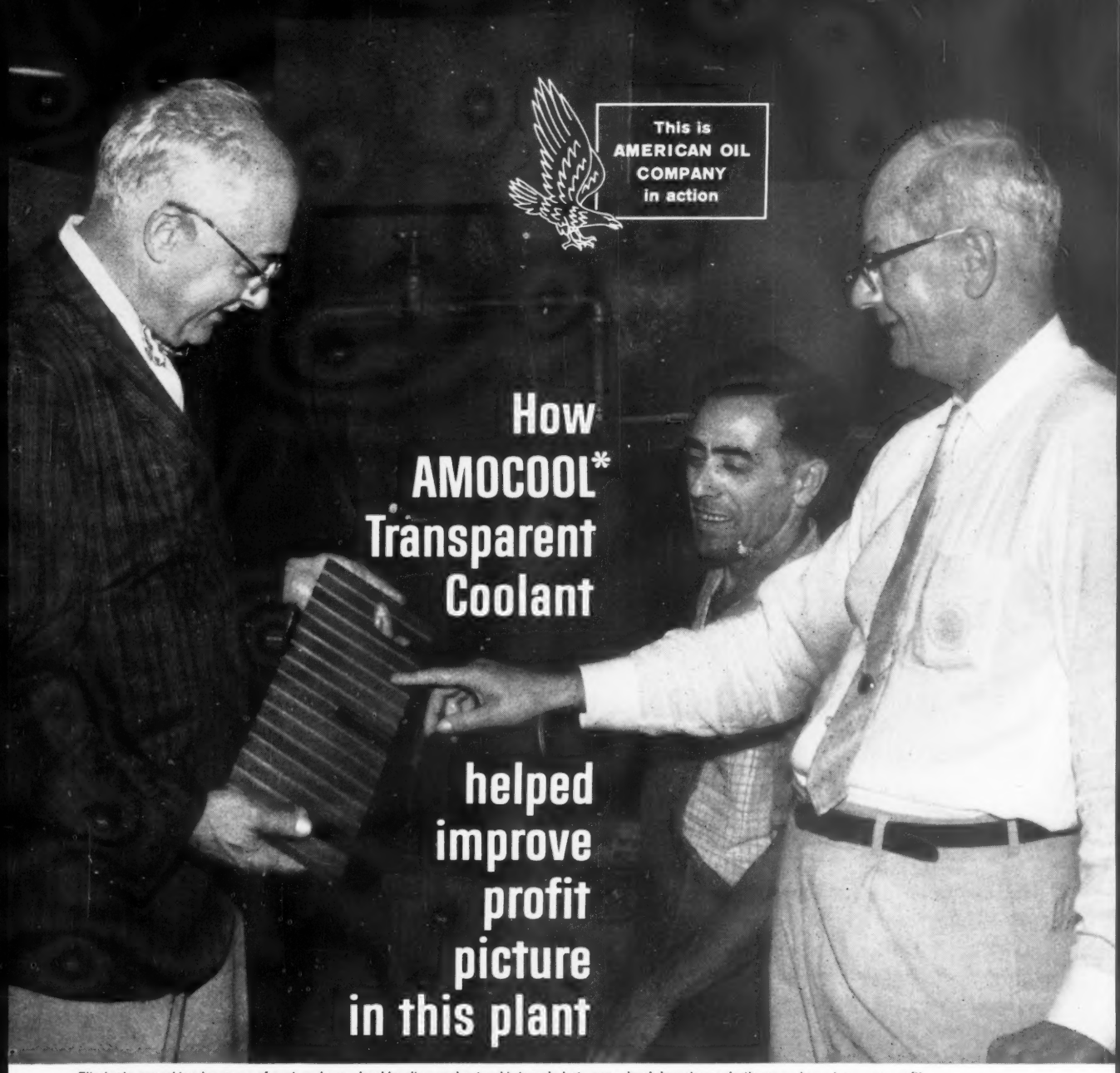
• **Problems**—Not all is peaches and cream in doing business with government buyers. The president of a small firm doing business with the military: "On one recent contract, I was required to bid using specifications which are at least five years outdated by technological progress. The specification sheets for one part of the weapon weighed twice as much as the part itself. It is virtually impossible to pin down *the* man who can make a decision on a change you may recommend. Buck passing has reached an unbelievable stage."

But despite numerous complaints (particularly of red tape), many companies continue to rely heavily on government business for profit.

PLAN FOR PROFIT GROWTH

Communicate for Profit Growth

On Nov. 20, STEEL will discuss metalworking managers' greatest weakness (communications) and suggest ways to improve them. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



How AMOCOOL* Transparent Coolant helped improve profit picture in this plant

Eliminate reworking because of rust, reduce wheel loading and extend intervals between wheel dressings; do these and you increase profit per unit, explains Detroit Edge Tool president, Dan Ebbing, to P. E. "Pappy" Stratton of American Oil. Sam Vineh, operator, looks on.

by PAUL E. "PAPPY" STRATTON

About the Author.

"Pappy" Stratton has been providing technical help on lubrication and metalworking problems to customers in the Detroit area for nearly all of the twenty-five years he has been working for the company. In addition to having this store of practical experience to help him, Pappy has completed the Company's Sales Engineering School.

☆ ☆ ☆

By using a soap-base grinding compound, Detroit Edge Tool Company was getting excessive corrosion and rust on work and grinding machines. Oil vapor was collecting on machines and on the ceiling, causing dirty working conditions. Most important, high wheel loading was causing frequent down-time for wheel dressings.

We worked out a test program on AMOCOOL Transparent Coolant with the management. On our first test on one surface grinder, feed pressure was cut substantially while at the same time metal removal was increased.

The cost of reworking parts to remove rust was eliminated. Time required to clean machines to get rid of the odor was cut in half. Less wheel loading and fewer wheel dressings have upped production and reduced costs. Our test program paid out in an improved profit picture. All grinding and drilling equipment has been converted to AMOCOOL Transparent Coolant.

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Would you like this kind of technical help to assist you in improving profits? Get it by calling the American Oil Company office nearest you.

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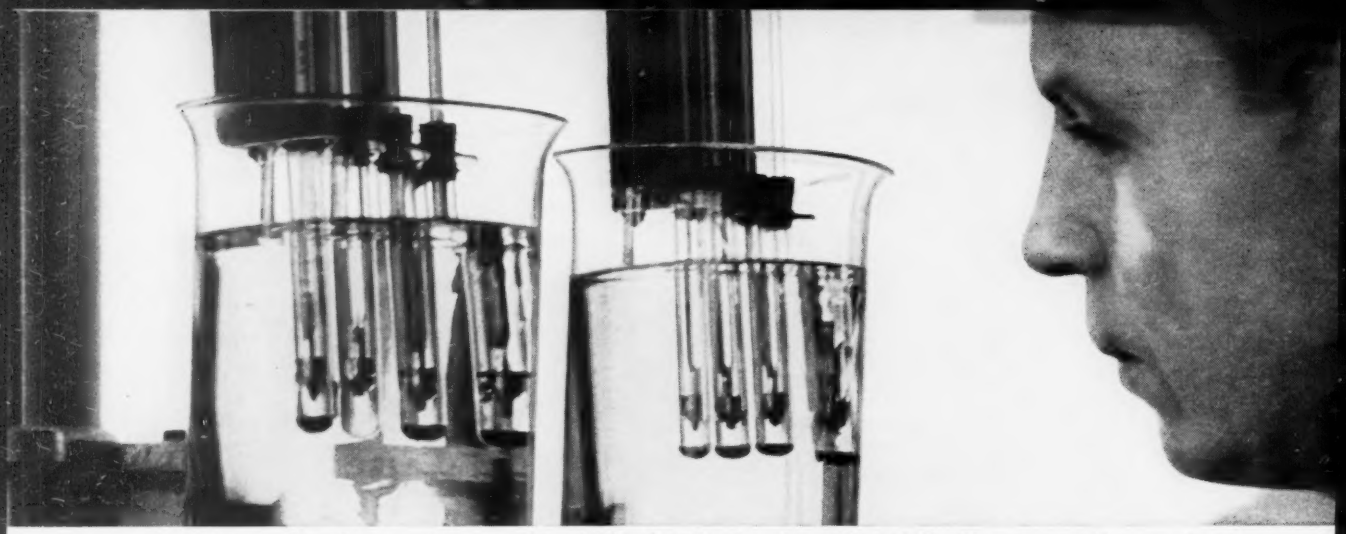

Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

*Registered Trademark

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

How Chrysler Cut Plymouth's Weight

Plymouth Fury Hardtop

Where Reductions Occurred

(Amounts used, in pounds)

	1962	1961
Carbon Steel	1,824.8	2,238.1
Alloy Steel	114.7	212.3
Stainless	8.4	*
Aluminized Steel	23.9	*
Galvanized	51.0	*
Aluminum	69.5	61.6
Zinc	37.8	44.0
Copper, Brass, Bronze	37.2	45.3
Lead	29.0	29.1
Magnesium	1.9	*
Plain Cast Iron	436.0	370.5
Alloy Cast Iron	*	195.2
Malleable Iron	77.4	81.3
Plastics	19.5	32.0
Miscellaneous†	612.8	356.0
Total	3,343.9	3,665.4

Source: Chrysler Corp. Based on curb weight of Plymouth Savoy V-8 sedan with automatic transmission. *These materials were not listed separately. †Includes glass, rubber products, soft trim, paper products, deadening materials, paint, 5 lb of solder, fuel, and lubricants.

CHRYSLER has redesigned the body for its 1962 Plymouths and Darts. The 202 in. long cars that share this body are 7 in. shorter than last year's and up to 321 lb lighter than their predecessors. William J. Clark, assistant chief engineer, advance body design, says that 30 per cent of the weight reduction can be attributed to body design. He adds that the 1962 body is a stronger, more rigid structure—featured are a 5 per cent increase in torsional stiffness and a 30 per cent increase in beam stiffness.

• **Three Examples:** Russell M. Cooper, chief engineer, body design, cites three basic reasons why Chrysler has been able to come up with a more efficient design for the 116 in. wheelbase cars: 1. The design group switched from a forestructure (stub frame) approach to a fully unitized body. 2. Designers and manufacturing engineers co-operated to simplify design and manufacturing techniques. 3. Accessories were scrutinized to see if they could be made lighter, or relocated so other parts could be redesigned to save weight.

Typical examples of weight saving changes in design made possible by the switch to a fully unitized body are front torsion bar anchor crossmember and fender side shields. In the older body, the crossmember which supported the torsion bar anchors and engines was designed as two matching channels. One was welded integrally into the body. The other was welded to the forestructure members. The two parts were nested and bolted together in attaching the forestructure to the car. Now one channel is eliminated—since all front end parts are welded into the body, and the additional support isn't needed.

Fender side shields also are weld-

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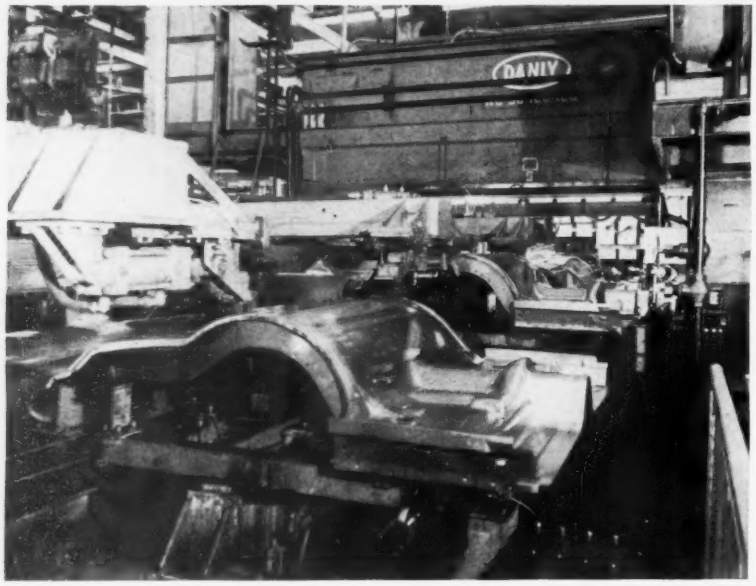


Redesign Reduces Subassembly Welds

CHRYSLER's Twinsburg, Ohio, stamping plant fabricates and welds the rear floor pan assembly for Plymouth and Dart bodies on a 32 station, automatic welding line. Rate: 255 units an hour. The number of welds in the assembly has been reduced from 850 to 600, reports Dewey Mahrle, plant engineer. The two areas where most welds were eliminated: Side rail members and floor pan welding extensions.

In the old style body, two piece stampings were welded together to form each right or left side rail. Now the parts are made as one piece, deep drawn stampings. Saving: 100 welds. The weld extensions (brackets to which outer skin panels are fastened) were formerly stamped separately and welded to the floor pan. Now they are stamped out as part of the pan section, so they don't have to be added later. Saving: 40 welds.

ed into the body, so they carry more of the load. The change now permits the use of lighter gage steel. It also makes for more efficient design since smaller size frame members can be used to support the stamped metal pieces. Previously, the shields were "hang on" items bolted to the frame. Mr. Clark figures that the two changes reduced weight by 25 per cent.

Other changes include welding front rails to the sills instead of bolting them together. The change eliminated double bolt brackets and the fasteners. The joint where the two halves of the floor pan meet has been changed from an overlapping box section joint to a Z-shape. The approach saves steel in the overlap, and the open Z-section joint is easier to rustpoof.

The size and gage of steel used for rocker panels (sills) was formerly determined by the strength requirements of hardtop models which have no center pillars. It meant the rocker panels for sedans were overdesigned and carried needless weight. Chrysler redesigned the parts on the basis of sedan strength requirements. In hardtops, a third reinforcing panel is welded between the inner and outer sills. There's no saving on the hardtops, but on the sedans, a 7 lb weight reduction is realized. Since sedans usually make up two-thirds of a model run, the saving in materials over a year is considerable.

• **Co-operation** — Working with manufacturing, Mr. Cooper's designers changed the dash panel from three major pieces to a one piece stamping and cut weight. The arrangement also trims manufacturing costs because it eliminates the need for additional dies, stamping presses, and welding equipment.

Early in the design stage. Chrysler engineers laid down principal locating points (PLPs) for major parts. The gage points serve as locating references for all phases of production. They provide more accurate dimensional control, which means the designers could specify welding flanges 0.090 in. narrower than they had before. It doesn't sound like much, but Mr. Cooper says it adds up to 3/8 in. off the length of a longitudinal section. "That adds up to a considerable amount of steel at the end of a model run, yet we still can meet standard weld flange widths, so we don't sacrifice any strength," he reports.

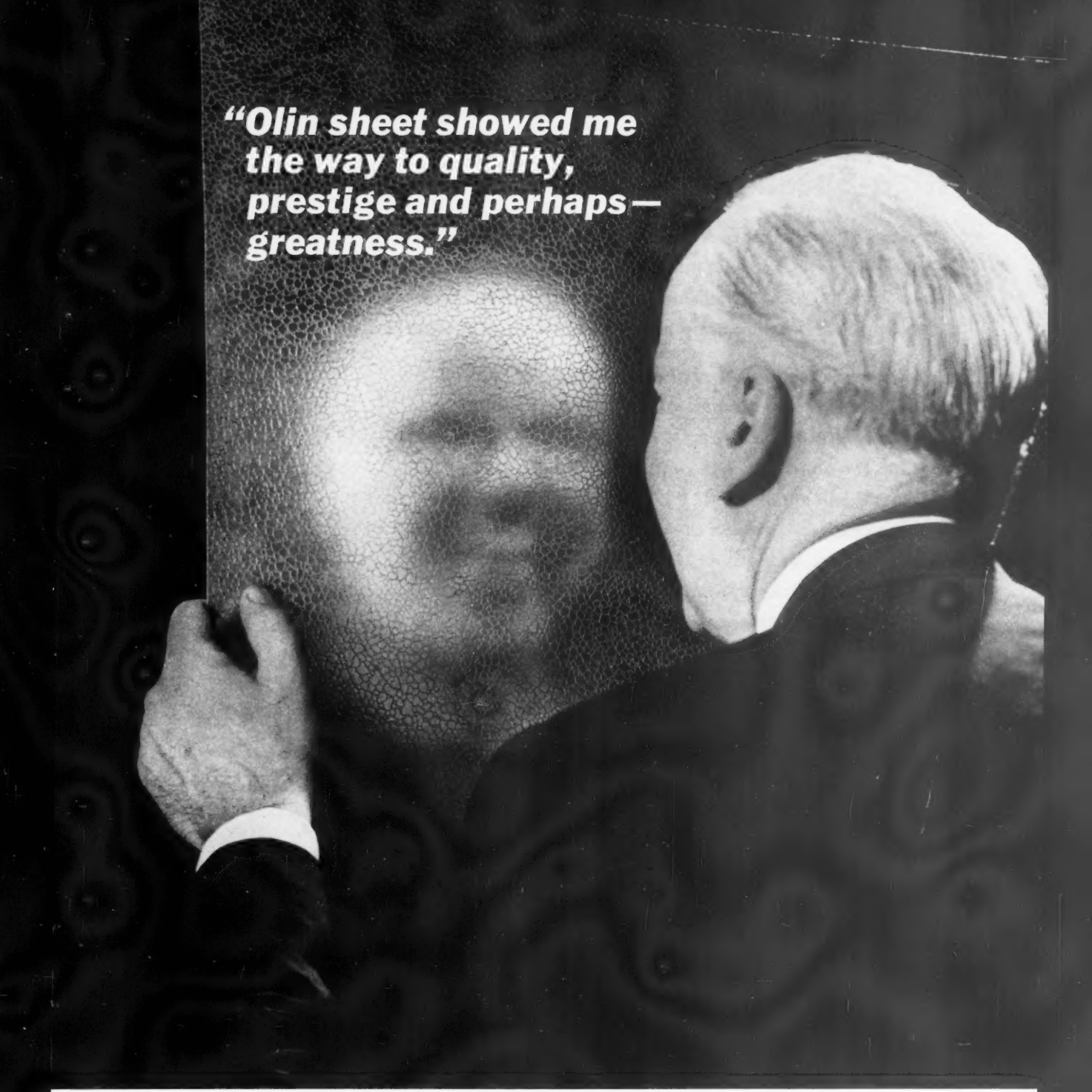
• **Equipment**—Mr. Cooper cited an example to show how components within the body must be checked during design: Chrysler relocated the electric motor that operates the power windows and changed the position of the front door handles. Result: Designers cut an inch off door thickness, which saves about 192 sq in. of steel on a four door sedan, or 62 tons of steel in every 100,000 production units.

U. S. Auto Output

Passenger Only	1961	1960
January	415,857	688,690
February	364,385	659,298
March	407,959	654,241
April	446,739	582,869
May	542,303	611,260
June	599,474	613,136
July	399,191	434,377
August	195,266	305,514
September	354,711	407,691
October	560,000†	617,972
10 Mo. Totals	4,285,885†	5,575,048
November	.....	597,638
December	.....	523,422
Total	.....	6,696,108

Week Ended	1961	1960
Sept. 30	114,551	134,118
Oct. 7	102,098	140,832
Oct. 14	96,207	144,056
Oct. 21	143,150	146,339
Oct. 28	161,278†	150,019
Nov. 4	165,000*	145,537

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.



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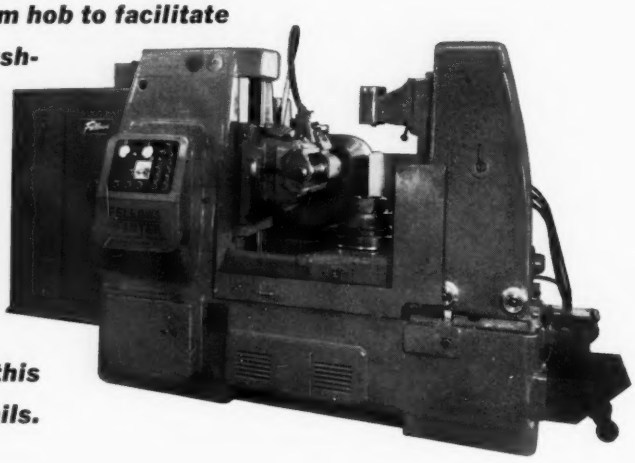
Work area is readily accessible for setup and loading, and table retracts automatically from hob to facilitate work changes. Hob shifting is by push-button. It's solid too, with rugged hob head and double wall construction column and bed, and heavy V-ways. Table is as large as maximum workpiece diameter — work column of massive design.



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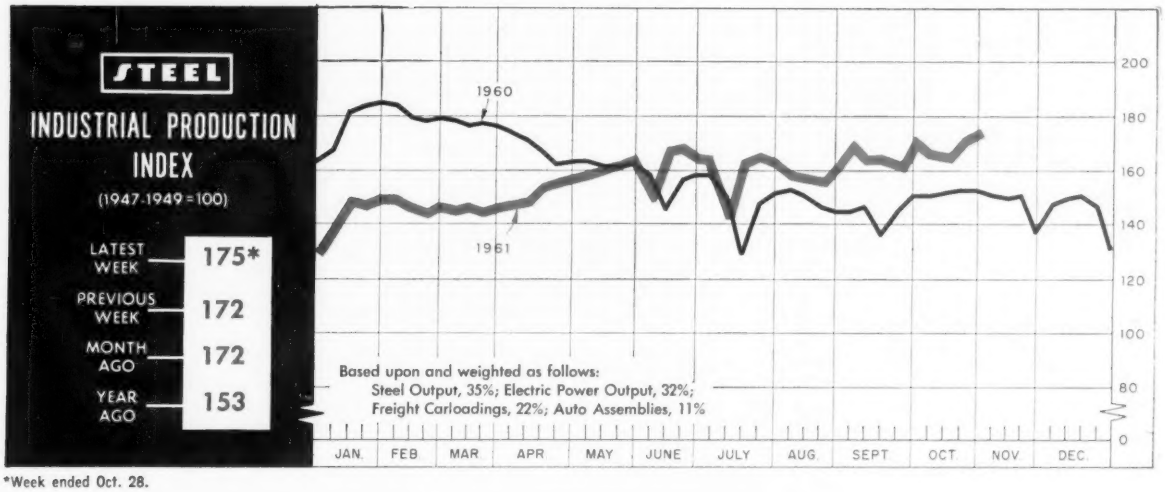


*Week ended Oct. 28.

Production Rises with Auto Peace

INDUSTRIAL PRODUCTION is at the highest point so far this year, and barring any more labor difficulties in major industries, it should continue to climb until yearend.

For the first time in many weeks, all four elements of STEEL's industrial production index are in a position of strength. But the automotive industry contributed the most to the gain of 3 points to a preliminary 175 (1947-49=100) during the week ended Oct. 28. In turning out more cars and trucks than in any week since early February, 1960, General Motors, Ford, and American Motors scheduled overtime, while Chrysler Corp. and Studebaker-Packard put in normal weeks. Totals for the week: 161,278 cars and 26,289 trucks. (Source: *Ward's Automotive Reports.*)

• **Assembly Peak**—As STEEL went to press, Detroit observers were not looking for a strike at Chrysler Corp., although "moods change overnight," as one man put it. Assuming no lengthy stoppage in the industry, it looks like car production this month will be around the 650,000 unit mark for the first time since the industry bounced back from the steel strike in early 1960. (That's about the rate of production during the last week of October, so any further rise in STEEL's index will come from other sources.)

General Motors is expected to make up only 100,000 units of its 180,000 unit strike loss, and it is doubtful that Ford will be able to recoup all its losses. A plus factor: Dealer inventories at the beginning of this month were only about 700,000 units vs. 920,000 a year ago, and it appears that January and February will continue to be strong automotive months.

The only missing link: Consistently strong retail sales. Early October looked good—all producers were in operation. Then Ford went down, and tight supplies hampered selling efforts again. *Ward's* feels: "Sales as a barometer of long term

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	2,068[1]	2,057	1,478
Electric Power Distributed (million kw-hr)	15,250[1]	15,162	14,271
Bituminous Coal Output (1000 tons)	8,555[1]	8,850	8,705
Crude Oil Production (daily avg—1000 bbl)	7,130[1]	7,118	6,821
Construction Volume (*ENR*—millions)	$417.1	$612.5	$348.1
Auto, Truck Output—U. S., Canada (*Ward's*)	196,340[1]	176,240	175,083
TRADE			
Freight Carloadings (1000 cars)	650[1]	651	621
Intercity Truck Tonnage (changes from year ago)	+6.7%	+4.7%	−1.5%
Business Failures (Dun & Bradstreet)	398	341	270
Currency in Circulation (millions)[2]	$32,849	$33,010	$32,120
Dept. Store Sales (changes from year ago)[2]	+4%	0%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,754	$28,394	$27,424
Federal Gross Debt (billions)	$296.2	$296.2	$291.2
Bond Volume, NYSE (millions)	$28.8	$28.6	$30.0
Stocks Sales, NYSE (thousands of shares)	16,991	16,802	15,863
Loans & Investments (billions, adjusted)[3]	$117.8	$117.0	$107.0
U. S. Govt. Obligations Held (billions)[3]	$34.6	$34.2	$28.2
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	225.4	225.0	222.5
All Commodities[6]	118.6	118.6	119.0
Commodities Other than Farm & Foods[6]	127.2	127.2	127.6

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

Coming

Nov. 13

IN

STEEL

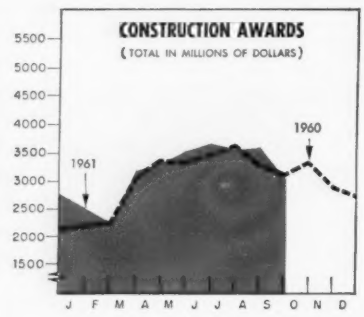
What Fate For Trade Agreements Act?

Are our reciprocal trade agreements really reciprocal? They are the heart of our foreign trade activity, and the statute that makes them possible is up for renewal in 1962.

What are the chances for change next year? What's the meaning for metalworking?

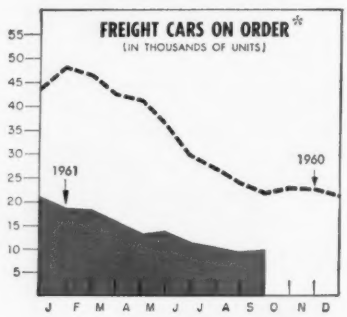
Those and other questions will be discussed Nov. 13 when STEEL examines this important factor in our foreign trade.

THE BUSINESS TREND



	Total		Building	
	1961	1960	1961	1960
Jan.	2,485	2,193	1,787	1,728
Feb.	2,235	2,240	1,674	1,685
Mar.	3,166	3,046	2,398	2,361
Apr.	3,297	3,360	2,504	2,527
May	3,501	3,337	2,658	2,563
June	3,602	3,472	2,779	2,593
July	3,529	3,597	2,656	2,481
Aug.	3,543	3,295	2,676	2,610
Sept.	3,004	3,119	2,367	2,402
Oct.	....	3,319	....	2,555
Nov.	....	2,886	....	2,169
Dec.	....	2,718	....	1,872
Totals	....	36,318*	....	27,345*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.
Charts copyright, 1961, STEEL.



	Domestic Awards		Backlogs (end of month)	
	1961	1960	1961	1960
Jan.	1,339	5,742	18,894	48,170
Feb.	1,536	3,211	18,429	45,323
Mar.	1,796	1,957	15,801	42,131
Apr.	2,040	5,352	13,658	41,003
May	3,666	2,285	13,964	36,106
June	1,214	316	11,821	29,555
July	2,452	1,331	10,644	26,658
Aug.	1,474	1,343	9,690	23,866
Sept.	3,143	2,206	10,133	21,662
Oct.	....	5,864	.....	22,900
Nov.	....	3,740	.....	22,781
Dec.	....	2,705	.....	21,070
Total	....	36,368		

*Domestic only.
American Railway Car Institute.

1962 trends cannot yet be accurately pinned down." But even the slightest encouragement in dealer activity during the next two months will keep the factories humming until close to 1 million cars are inventoried.

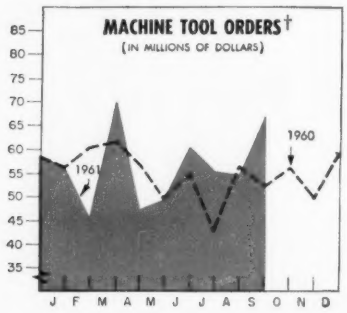
• **Steelmakers Respond**—Steelmaking is edging up slightly as a result of higher automotive output, but it will continue to be a source of strength in the index through the first half of 1962. Diverse seasonal factors are preventing the large weekly increases that are usually associated with high auto production. Market analysts are still predicting that the industry will produce close to 110 million tons next year, with perhaps 60 million tons being poured in the first half. That will require a few weekly totals of about 2.2 million tons compared with the current level of 2,068,000 tons.

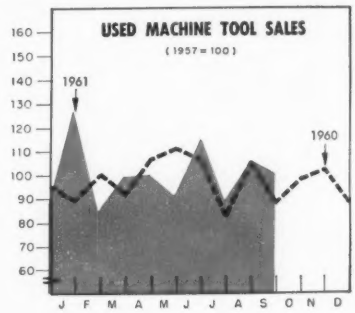
• **Electricity Surging**—The seasonal pickup in the output of electricity has started and should follow a fairly steady upward trend (with the exception of the Thanksgiving week) until late in December. While the big impetus comes from colder weather and shorter daylight hours, industrial usage in a rising economy can be counted on to increase the 1961 total in excess of the normal year-to-year gains.

• **Carloadings to Decline** — The Great Lakes ore shipping season is nearing its end, and with it comes a gradual decline in railroad freight carloadings. The total may be near the 650,000 car level until the second week of this month, but then it will trail off until a trough is reached in midwinter. While the trend will have a tendency to hold STEEL's index in check, it should be recognized that freight carloadings alone do not reflect the movement of goods as accurately as they once did. For instance: In 1957 (which some analysts still consider the last "good" year), loadings averaged about 680,000 cars a week, or 30,000 cars above the best level recorded this year.

Truck loadings must also be taken into account. The American Trucking Associations Inc. reports loadings have been gaining steadily all fall. In the latest week, they were 6.7 per cent ahead of the year-ago total.

• **Record in Doubt**—STEEL's industrial production trend line is still 10 points below the all-time high of





	New Orders (000 omitted) 1961	1960	Shipments (000 omitted) 1961	1960
Jan.	$56,100	$56,450	$45,500	$46,400
Feb.	46,400	60,600	45,650	51,950
Mar.	70,050	61,950	54,850	64,500
Apr.	47,650	51,850	53,700	55,100
May	49,600	49,950	57,900	56,350
June	60,500	55,100	64,200	63,100
July	55,650	42,950	49,750	51,300
Aug.	54,900	56,850	47,000	47,900
Sept.	67,300*	52,300	52,100*	53,950
Oct.	.....	56,200	.....	51,350
Nov.	.....	49,950	.....	48,550
Dec.	.....	59,000	.....	61,350
Totals	.....	$653,150	.....	$651,800

†Cutting and forming. *Preliminary. National Machine Tool Builders' Assn.

	1961	1960	1959	1958
Jan. ...	126.5	89.2	84.9	93.9
Feb. ...	83.8	100.3	114.9	94.6
Mar. ...	99.0	91.4	108.1	82.5
Apr. ...	99.8	106.7	103.1	81.5
May ...	90.7	111.1	113.0	77.2
June ...	115.0	106.4	101.9	86.8
July ...	89.1	82.2	105.0	89.2
Aug. ...	105.7	105.0	108.4	72.5
Sept. ...	100.3	87.9	114.6	88.1
Oct. ...	....	98.4	112.6	99.9
Nov. ...	....	101.8	98.4	94.9
Dec. ...	....	87.8	95.5	104.9
Avg ...	....	97.4	105.0	88.8

Source: Machinery Dealers National Association.

185 set in the week ended Jan. 23, 1960. It seems unlikely that it will regain that level in 1961 unless all four elements hit their peaks concurrently—and the pickups will have to come within the next week or two. Chances are slim.

Construction Outlook Good

Construction activity is entering its seasonal decline, but don't let it fool you about prospects for 1962. They're still good. Evidence: Contracts for future construction and bookings for structural steel assure plenty of building in months to come. While contracts didn't measure up to expectations in September (see graph and table, Page 74), October may prove to be one of the biggest months of the year. At the start of the month, *Engineering News-Record* reported contracts were 4 per cent behind the year-ago pace. By Oct. 26, the gap had been narrowed to 2 per cent. Awards averaged above $450 million a week last month, which is high for that or any other month.

In addition, bookings for fabricated structural steel reached 408,000 tons in September, the second highest total this year and 40 per cent ahead of the year-ago mark. In the first nine months, bookings were 10 per cent ahead of those in the corresponding period of 1960. At 2,729,313 tons, the industry's backlog is the highest it has been in at least two years.

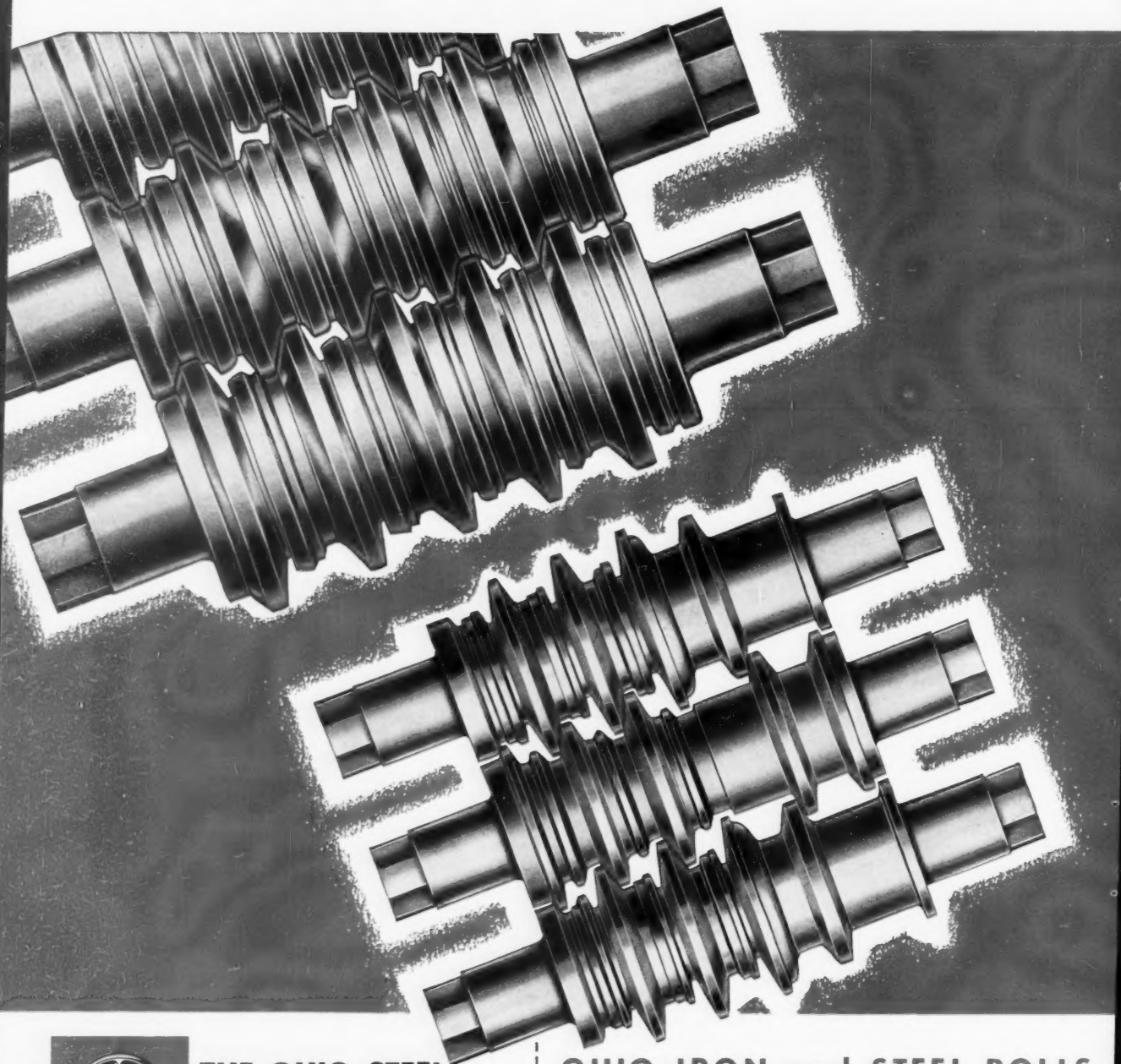
Economists Show Caution

The annual poll of 316 economists by F. W. Dodge Corp. illustrates a movement that has been taking place for about six weeks. Economists, who were riding high on the record pace of the first six months of the upturn, are tempering their judgments to a marked degree. For instance, the Dodge survey forecasts gross national product at $565 billion by the fourth quarter of 1962. In the last week of September, STEEL's Panel of Economic Consultants (most participate in the Dodge poll) put GNP at $564 billion in the third quarter. The Dodge study shows a consensus of 122 for the Federal Reserve Board's industrial production index by December, 1962. STEEL's economists said 121 for the third quarter. Point to remember: Current conditions are bound to influence the magnitude of such predictions. Direction is still the important thing to watch.

THE 52100 HOUSE
INDUCTION • CONSUMABLE • LEADED
PETERSON STEELS, INC.
Union, N. J. • Wethersfield, Conn.
Detroit, Mich. • Melrose Park, Ill.

Ohio Rolls

Shaping Metal for all Industry



THE OHIO STEEL FOUNDRY COMPANY
LIMA, OHIO

OHIO IRON and STEEL ROLLS

Carbon Steel Rolls	Flintuff Rolls	Denso Iron Rolls
Ohioloy Rolls	Double-Pour Rolls	Nickel Grain Rolls
Ohioloy "K" Rolls	Chilled Iron Rolls	Special Iron Rolls
Nioloy Rolls	Forged Steel Rolls	

PLANTS AT LIMA AND SPRINGFIELD, OHIO. *. Virtually at the center of the Steel Industry*

OR-51

CHARLES W. ESCH JR.
Bunting Brass plant supt.

JOSEPH BENEDICT
DoAll prod. sales mgr.

LEONARD C. ROSE
CF&I president

JOSEPH S. PARES
Leach gen. sales mgr.

Charles W. Esch Jr., former chief engineer of Randall Graphite Bearings Inc., Lima, Ohio, was named general plant superintendent of the Toledo, Ohio, plant of **Bunting Brass & Bronze Co.**

Joseph Benedict was promoted to product sales manager on OEM products, special machines, and fixturing for **DoAll Co.**, Des Plaines, Ill.

Glenn Hutt was elected president of **Bettinger Corp.**, Milford, Mass. He served for 27 years with Ferro Corp., Cleveland.

Gene P. Kirwan was made general works manager, **Waterbury Rolling Mills Inc.**, Waterbury, Conn.

H. L. Stewart was made vice president and sales manager, **Logansport Machine Co. Inc.**, Logansport, Ind. He was manager of Scott Industrial Equipment Co., Indianapolis, for the last year. He previously was with Logansport.

Leonard C. Rose, former executive vice president, was elected president and chief administrative and operating officer of **Colorado Fuel & Iron Corp.**, Denver. He succeeds **Alwin F. Franz**, who becomes chairman. **Charles Allen Jr.**, former chairman, was elected chairman of the executive committee.

George F. Crosby Jr. was made manufacturing manager, Hudson, N. Y., Div., **Emhart Mfg. Co.** He was manufacturing manager at Hewitt-Robins Inc.'s Conveyors Div.

Joseph J. Wilks Jr. was made superintendent of machine shops at **Mesta Machine Co.**, Pittsburgh.

R. H. Morley was made general manager in charge of manufacturing at **Parker-Kalon Div.**, Clifton, N. J., General American Transportation Corp. He was assistant to the president. **Louis Oest** was named chief standards engineer. **Alfred Battagliero**, former chief engineer, was made production manager.

Joseph S. Pares was named general sales manager of **Leach Corp.**, Compton, Calif., in charge of all field operations. He was manager of the San Francisco area office at Palo Alto, Calif.

Frederick A. Alden was made purchasing manager of **Black & Decker Mfg. Co.**, Towson, Md., to succeed **Alex N. Dahl**, named manager of special sales, Marketing Div.

W. Owen Lawrence was made vice president-manufacturing, **Universal Atlas Cement Div.**, New York, U. S. Steel Corp. He succeeds **L. M. Funderburg**, who assumes other responsibilities.

P. E. Dutcher was appointed director of marketing, Industrial Products Div., Wilmerding, Pa., **Westinghouse Air Brake Co.**

Robert A. Lubker was elected vice president-research and development, **Alan Wood Steel Co.**, Conshohocken, Pa., a newly created post. He

H. L. STEWART
Logansport Machine v. p.

R. H. MORLEY
Parker-Kalon mfg. post

P. E. DUTCHER
Westinghouse Air Brake post

ROBERT A. LUBKER
Alan Wood Steel v. p.

WILBUR M. PRIESTER
Frick foundry supervisor

JOHN R. BAKER
MB gen. mgr.-manufacturing

WOLFGANG MATEJKA
heads Temescal foundry dept.

ROBERT J. KENNY
Air Impeller chf. design eng.

formerly served as director of research and development.

Wilbur M. Priester was appointed foundry supervisor at **Frick Co.**, Waynesboro, Pa., in charge of all foundry and pattern shop operations.

John R. Baker was named general manager of the Manufacturing Div. of **MB Electronics**, New Haven, Conn., a division of Textron Electronics Inc.

Harold Gerber was promoted to vice president-sales, **Industron Corp.**, Newton Highlands, Mass.

Aluminum Extrusions Inc., Charlotte, Mich., appointed **W. G. James** sales manager, Fabrication Div.; and **D. E. Gill** sales manager, Extrusions Div.

Michael F. Hazel was appointed president, **Oil Well Supply Div.**, Dallas, U. S. Steel Corp. Former executive vice president, he succeeds **Fred F. Murray**, retired.

Wolfgang Matejka was named to head **Temescal Metallurgical Corp.'s** High Vacuum Foundry Dept., Berkeley, Calif. He was supervisor of Kelsey-Hayes Co.'s Casting Dept. in New Hartford, N. Y., and previously managed the Investment Foundry Dept. for Sulzer Bros. Ltd., Winterthur, Switzerland.

Arthur G. Fitzpatrick, formerly with Burroughs Corp., joined **Omnitronics Inc.**, Philadelphia, subsidiary of Borg-Warner Corp., as sales manager.

Richard R. Mease was made manager of OEM sales for **Hydreco Div.**, Kalamazoo, Mich., New York Air Brake Co. He is replaced by **Charles B. Blackburn** as manager of parts and services.

Arthur F. Flood was elected vice president-administration at **Kollsman Instrument Corp.**, Elmhurst, N. Y., division of Standard Kollsman Industries Inc. **R. C. Rhodes** was made director of industrial engineering.

Robert J. Kenny was made chief design engineer, Air Impeller Div., **Torrington Mfg. Co.**, Torrington, Conn. He was senior project engineer with Electrolux Corp.

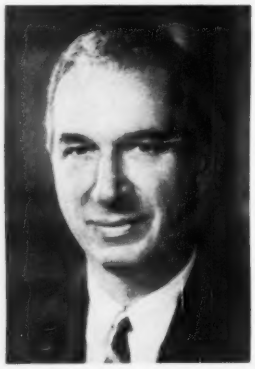
R. E. Goodwill was made sales manager, Electrical Dept., Norwood, Ohio, Works, **Allis-Chalmers Mfg. Co.** He succeeds **J. F. Fenske**, now manager-motor sales, Pacific region, San Francisco.

John E. Gill was made manager of heavy duty fan sales at **Buffalo Forge Co.**, Buffalo. **Robert Jorgenson** was made chief engineer, Air Handling Div., replacing Mr. Gill.

E. I. Henning was made general manager of the Sulphur Springs, Tex., plant of **Rockwell Mfg. Co.'s** Meter & Valve Div. He succeeds **E. E. Matheson**, who will have overall charge of Sulphur Springs Div. operations as assistant to the vice president.

Howard L. Sullivan was promoted to assistant sales manager, **Parker**

W. G. JAMES
Aluminum Extrusion sales



MICHAEL F. HAZEL
Oil Well Supply president

ARTHUR F. FLOOD
Kollsman Instrument v. p.

E. I. HENNING
Rockwell plant mgr.

CINCINNATI
Hydroform
Now,
7 Times
Faster!
New CINCINNATI
Hi-Production Hydroform

The NEW Cincinnati Hi-Production Hydroform is available in sizes to accommodate blanks of 8", 10", 12", 15", 20", 25", 30", and 40" diameter. A 12" machine is shown.

The part shown is a coffee pot body formed from a 12" dia. blank of .032" copper. It is formed in 1 draw in less than 6 seconds. Conventional method requires 5 draw operations and 2 anneals. Part depth is 6-13/16"; minimum dia. is 2-17/32".

The NEW Cincinnati Hi-Production Hydroform is the most advanced deep drawing machine in the metal forming field. For full details, contact a Meta-Dynamics Division application engineer or write for Catalog No. M-2193C.

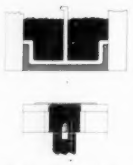
New **CINCINNATI** Hi-Production Hydroform® has many advantages for deep draw work:

- Operating rates range from 600 to 1800 cycles per hour. Production rate is proportional to depth of part. Traverse speeds are fast. Draw speeds are well below the critical draw speed for any material.
- Complex parts are drawn in fewer operations.
- Improved part surface finish reduces finishing costs.
- Many hard-to-draw materials can be formed successfully.
- Tool costs are extremely low, as compared to conventional die sets.
- Tools can be changed in 5 to 10 minutes.
- Cuts material costs by minimizing thin-out. Thickness of the blank can often be reduced.
- Double blanks will not damage tooling or machine.

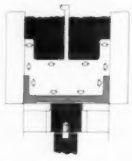
★ ★ ★

Cincinnati Hydroform can also be used as a high tonnage conventional press for coining, cold extrusion, or other jobs requiring high unit forming pressure.

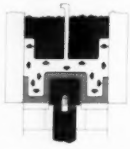
Cincinnati Hydroform unique deep drawing principle is shown below.



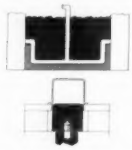
1. Blank is placed on blankholder.



2. Forming chamber is lowered and initial pressure applied.



3. Punch moves upward into flexible die member.



4. Pressure is released, forming chamber raised, and punch is stripped from finished part.

META-DYNAMICS DIVISION

Center of Chipless Machining
Hydroform • Intraform • Hydrospin

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio

Fittings & Hose Div., Parker-Hannifin Corp., Cleveland.

John A. Robbins was made general manager of **Compressed Steel Shafting Co.**, Hyde Park, Mass., subsidiary of Murray Co. of Texas Inc.

Rufus C. Stillman was made vice president of **Torrington Co.**, Torrington, Conn. He was assistant to the president. His duties include staff matters pertaining to all divisions of the company in the U. S. and Canada.

L. J. Levisee was made director of purchases, a new post at **Hyster Co.**, Portland, Oreg. He was director of material for Hughes Aircraft Co.

Gilbert B. Richards Jr. was named president of **Richards Industries Inc.**, Cincinnati, a new company which acquired Dover Corp.'s OPW-Jordan Div. (manufacturer of regulator and control valves). He was president of the Dover division. Operations will be carried on as in the past, under the name of Jordan Valve Div. of Richards Industries Inc.

Dr. Frederick D. Ezekiel was named general manager of **American Measurement & Control Inc.**, Waltham, Mass., subsidiary of CompuDyne Corp. He was director of research. He succeeds **Donald G. O'Brien,** who remains as a consultant.

Robert S. Meighen was made assistant vice president-sales, **National Steel Corp.** He retains the position of vice president-sales, Weirton Steel Div., and continues headquarters at Weirton, W. Va.

Ralph B. Watt was made manager of Southern mines for **Republic Steel Corp.**, Birmingham. He succeeds **B. H. McCrackin,** retired.

Howard J. Luetzow was made manager of special product sales, **Wolverine Tube Div.**, Allen Park, Mich., Calumet & Hecla Inc.

J. J. Kroecker was named vice president-sales, Permold Co., Medina, Ohio. He succeeds **L. E. DeGroat,** retired.

Joseph Tierney was named sales manager, Tooling Materials Div., Olean, N. Y., **Hysol Corp.**

Warren E. Poitras was elected vice president and director of marketing, **Swedlow Inc.**, Los Angeles.

JOHN A. ROBBINS
Compressed Steel Shafting post

RUFUS C. STILLMAN
Torrington vice president

L. J. LEVISEE
Hyster dir.-purchases

GILBERT B. RICHARDS JR.
Richards Industries pres.

JOSEPH L. BURG
Burgmaster president

ROGER W. ROBINSON
Clark div. gen. sales mgr.

Joseph L. Burg, former vice president-sales and engineering, **Burgmaster Corp.**, Gardena, Calif., was elected president.

Charles E. Lamar, executive vice president, **Southern Pipe Div.**, Azusa, Calif., U. S. Industries Inc., was elected president to succeed **D. A. Stromsoe**, retired.

Samuel J. Gibson was made sales manager of **Cary Chemicals Inc.**, East Brunswick, N. J.

W. Owen Lawrence was made vice president-manufacturing, **Universal Atlas Cement Div.**, New York, U. S. Steel Corp., to succeed **L. M. Funderburg**, who assumes other responsibilities.

L. A. Napper was promoted to chief engineer, fabricated steel construction for **Bethlehem Steel Co.'s** Pacific Coast Div., San Francisco. He succeeds **R. W. Binder,** retired.

Mervin H. Luria, district manager of the Los Angeles office of **Luria Bros. & Co. Inc.**, was made assistant regional vice president.

Roger W. Robinson was named general sales manager of **Clark Equipment Co.'s** Automotive Div., Jackson, Mich. He was manager of transmission sales.

D. M. Middleton was made Cleveland operations manager for **L. B. Foster Co.** He was sales manager, Pittsburgh regional office.

Dr. Le Roi E. Hutchings was made associate director of research for **Great Lakes Carbon Corp.** He is at the research center, Morton Grove, Ill.

OBITUARIES...

Perry B. Campbell, 62, a product manager at **Buffalo Forge Co.**, Buffalo, died.

Bertram Kaplan, 63, chairman, **U. S. Railway Equipment Co.**, and **M. S. Kaplan Co.**, Chicago, died Oct. 23.

N. E. Molleck, 63, general superintendent of production at **Maytag Co.'s** Plant No. 1 in Newton, Iowa, died Oct. 27.

Who else wants to save $100,000 this year?

How the Revere Technical Advisory Service Showed a Metal User the Way to Profit-Protecting Economies — and can do the same for you!

A leading manufacturer—you'd recognize the name immediately—is a heavy user of copper and its alloys. It buys sheet, strip, tube, rod—by the hundreds of tons. Recently, this company invited the Revere Technical Advisory Service to inspect its operations, study its metals needs, analyze its buying practices and look into its specifications. The Revere people were actually treated as members of the crew at the company's plants; nothing pertinent was kept secret, no knowledge hidden.

The result? Recommendations all down the line on every phase of copper and copper alloy procurement and use—and production savings made possible in every area. The Revere Technical Advisor actually showed the way to an astonishing potential saving . . . well over $100,000 yearly!

Naturally, not every company can expect such huge savings. Too many variables enter in. But *if* detailed knowledge of metals, their manufacture and their uses can be applied to *your* product and *your* production, the Revere Technical Advisors are at your service. These are the men who know non-ferrous metals best—and many other metals equally well. They are ready to serve you—*now*.

You can reach the Revere Technical Advisory Service simply by calling or writing the Revere Office nearest you. If you are interested in a cooperative program of this kind and in discussing your metals procedures fully—in confidence—call Revere today. You will find that you have taken the first step toward profit-protecting economies. No obligation, of course.

REVERE

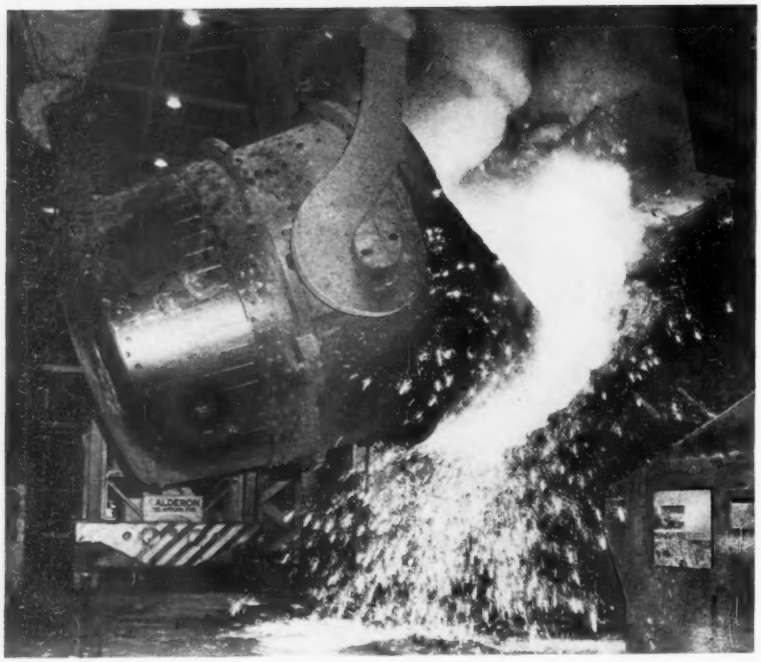
COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Ave., New York 17, N. Y.

Mills: Rome, N.Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities.

Distributors Everywhere



Molten blast furnace iron is charged in new . . .

Oxygen Furnaces Installed At J&L's Cleveland Works

TWO PEAR SHAPED oxygen furnaces, each weighing 455 tons, have been installed at the Cleveland Works of Jones & Laughlin Steel Corp. Each vessel can produce 240 ton heats of high purity steel in 59 minutes, the company says.

Key to the speed is a 1500 mph jet of pure oxygen which is introduced by a water cooled lance.

The two furnaces were installed by Koppers Co. Inc., Pittsburgh. They were designed and built by the Pennsylvania Engineering Co., New Castle, Pa. They are 27 ft 10½ in. high and 21 ft 8½ in. in diameter at their widest points. Furnace mouths are 7 ft wide. Each has a 141 ton steel shell, and 314 tons of refractory material were used in each lining.

The furnaces are supported by trunnions weighing more than 112 tons each. They allow the giant vessels to rotate through 360 degrees. Counting the height of the trunnion and the space needed for the steel and slag ladles, each furnace is as tall as a six story building. A pair of 200 horsepower motors is needed to tilt each unit.

The furnaces and most auxiliary equipment are housed in 20 story, steel buildings. An oxygen generating plant, built by Air Products & Chemicals Inc., Allentown, Pa., contains two generators capable of producing 534 tons of 99.5 per cent pure oxygen a day. Storage facilities will accommodate 815,000 cu ft of gaseous oxygen and 18 million cu ft of the liquid form. It takes about 1800 cu ft of oxygen to produce a ton of steel.

Electrostatic precipitators for smoke and dust control are incorporated in the oxygen system and also serve the Cleveland Works's open hearths.

A rapid, furnace charging technique was developed by Calderon Automation Inc., Cleveland. Scrap is loaded into boxlike containers which are put on a scrap charger and chuted into the furnace in a single operation. The setup reduces a heat cycle by several minutes. Other slag forming charging materials are introduced via conveyor belts and a chute.

In addition to the oxygen furnaces, the Cleveland Works has two electric furnaces and three oxygen lance open hearths. Eight smaller conventional open hearths that have been operating since 1924 will be dismantled.

The installations are part of a $250 million modernization of the Cleveland facility which was started in 1949.

English Steelmakers 'Buy American'; Germans Edged

TWO BRITISH STEELMAKERS, English Steel Corp. Ltd. and Hadfields Ltd., will install three, vacuum steel production units made by Lectromelt Furnace, Pittsburgh, a division of McGraw-Edison Co. Two, Lectromelt, D-H vacuum process units (one handles 125 tons of molten steel, the other 60 tons) will be installed at English Steel's Manchester and Sheffield Works. A Lectromelt, vacuum arc, consumable electrode furnace will be installed at the Sheffield plant of Hadfields Ltd.

Lectromelt bid against West German firms which also build the vacuum equipment under license from Dortmund-Horder Huttenunion AG. Claude Elliott, Lectromelt president, attributes the successful bid to his company's production experience and the simplicity of its design.

Continental Gin Expands

Continental Gin Co., Birmingham, a division of Fulton Industries Inc., is adding 205,000 sq ft to its factory, office, and warehouse in Prattville, Ala. The additions will increase capacity for manufacture of cotton gins and related equipment by about 50 per cent, Continental President A. L. Vandergriff reports.

When the new structures are finished in 1962, the firm's executive, engineering, and sales offices will be transferred there.

$3 Million Melting Shop Planned for Simonds Saw

A $3 million melting shop is the latest project in an expansion program at Simonds Saw & Steel Co.'s Lockport, N. Y., steel mill. A press forging facility, bar mill addition, cold rolling mill, and office alteration have been added since 1958. When completed within three years, the 75,000 sq ft melting shop will replace Simonds' present Ohio Street plant which will then be shifted to other work.

Bendix Splits Operations

Military and commercial operations of Bendix Corp. at South Bend, Ind., have been separated into the Bendix Products Aerospace Div. and Bendix Products Automotive Div. They were previously the aircraft and automotive sections of the Bendix Products Div. R. E. Whiffen continues to head the military work as general manager of the aerospace division and R. G. Caouette becomes general manager of the automotive division.

Harvey Buys U. S. Plant

An unused aluminum extrusion plant owned by the federal government in the labor surplus area of Adrian, Mich., has been purchased by Harvey Aluminum Inc., Torrance, Calif. Harvey paid $3.6 million for the facilities consisting of 820,000 sq ft of floor space in eight buildings on 73 acres. The plant is being surveyed by Harvey to see what kind of production it will house and what refurbishing will be needed.

Bethlehem's Lackawanna Plant Gets Ovens, Mill

A new battery of 76 coke ovens is being slowly heated at the Lackawanna, N. Y., plant of Bethlehem Steel Co. This marks a final stage of a modernization program giving the facility a total of 535 coke ovens. They will boost coke production to 2.5 million tons yearly, says Wilbur G. Smith, Lackawanna plant general manager.

Construction has also begun on a new galvanizing mill capable of handling sheets up to 72 in. wide and coils weighing up to 70,000 lb. Annual capacity is estimated at 200,000 tons. The structure housing the mill will have blue-gray Bethnamel siding, frequently used in curtain wall construction of modern buildings.

Metalworking Briefs . . .

Coated Products Div., Fullerton, Calif., Rheem Mfg. Co., has added facilities to its plant for coating metals and other products with anti-corrosion epoxy resin . . . Industrial Div., Monterey Park, Calif., Birtcher Corp., has opened a laboratory for research and development of electronic heat transfer devices and thermal problems of electronic packaging. Will Perry, formerly of Lincoln Laboratory, Massachusetts Institute of Technology, and Hoffman Electronics Corp. is director . . . Allen-Sherman-Hoff Fluid Transport Div., Paoli, Pa., A-S-H Industries Inc., has been set up for design, development, sales, and service of hydraulic and pneumatic systems for handling bulk materials . . . The application of diamonds in industry will be studied in the recently opened Diamond Application Development Laboratory in the Metallurgical Products Dept., Detroit, General Electric Co. E. L. Kapernaros is manager of the new facility.

NEW OFFICES

The **Engine-Material Handling Div., Milwaukee, Allis-Chalmers Mfg. Co.**, has established Milwaukee Retail Material Handling Branch at 3305 N. 124th St., Brookfield, Wis. Lloyd Miller is branch manager.

Mimik Tracers Inc., Buffalo, has opened an office in Frankfurt am Main Sued, West Germany, for the sale and service of hydraulic machine tool tracer attachments.

Scientific and Process Instruments Div., Beckman Instruments Inc., has opened a new sales office at 6506 E. 27th St., Tulsa, Okla. John C. Christiansen heads it.

CONSOLIDATIONS

Kenyon Instrument Co. Inc., Brewster, N. Y., will become a wholly owned subsidiary of the **Flexible Tubing Corp.**, Guilford, Conn., under a merger plan announced by Frederick K. Daggett, president of Flexible, and John W. Gillies, chairman and president of Kenyon. Directors and managements of both firms have already approved the move, which will involve an exchange of stock.

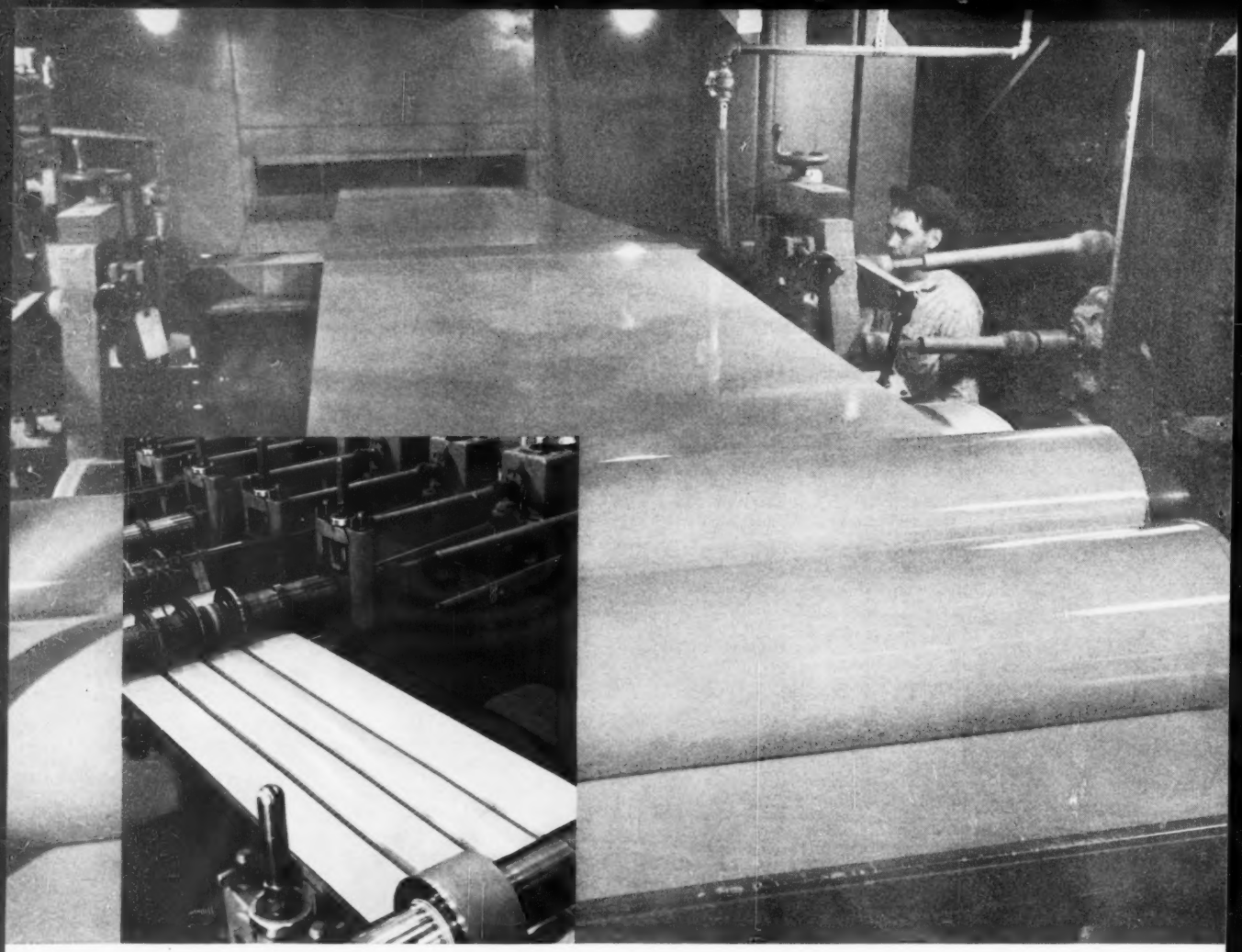
Cavitron Corp. and its subsidiary, **Cavitron Equipment Corp.**, have merged to form **Cavitron Ultrasonics Inc.**, Long Island City, N. Y.

ASSOCIATIONS

Leslie S. Wilcoxson, vice president of Babcock & Wilcox Co.'s Boiler Div., has been elected chairman of the **Welding Research Council-Engineering Foundation** for a three year term. He had previously been vice chairman of the council.

Officers of the **Cast Bronze Bearing Institute**, product group of the **Non-ferrous Founders' Society**, re-elected at the annual meeting are: President, Carter N. Paden Jr., assistant sales manager, Moccasin Bushing Co., Chattanooga, Tenn.; vice president, A. G. Eberle, general superintendent, Renewal Service Inc., Philadelphia; and secretary-treasurer, Raymond O. Oyler, vice president-sales, Bunting Brass & Bronze Co., Toledo, Ohio.

New officers of the **Non-Ferrous Founders' Society** are: President, Dan A. Mitchell, vice president-sales, Progressive Brass Mfg. Co., Tulsa, Okla.; first vice president, L. J. Andres, president, Lawran Foundry, Milwaukee; second vice president, George W. Stewart, president, East Bay Brass Foundry, Richmond, Calif. Herbert F. Scobie, executive secretary, continues as secretary-treasurer.



Glidden coating withstands stresses of continuous forming without cracking, chipping or film failure.

Coil coating line accelerates roof deck finishing to 125 feet per minute for Wheeling Steel

Wheeling Steel Corporation decided to convert their roof deck fabricating operation to continuous roll forming.

Problem they pitched at Glidden Technical Service Representatives: "Can you engineer a coating system to fit into this operation?"

They could and did.

Glidden recommended and worked with Wheeling engineers in developing and installing a continuous coil coating line. Result was a 5-stage power washer, reverse roll coater that coats both sides simultaneously and a 4-stage bake oven with coating speeds to 125 feet per minute.

This system actually resulted in a better surface preparation and finish than before, and the recommended Glidden coating exhibited excellent abrasion resistance and flexibility during recoiling and forming.

The experiences and resources of Glidden Technical Service are available to you in developing the best coating system for your particular needs.

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COATINGS AND RESINS DIVISION

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BRIDGE WELDED WITH CO_2— A four lane highway bridge in northern Wisconsin was constructed with on-site, semiautomatic welding employing carbon dioxide shielding. Costs were cut 20 per cent, claims A. O. Smith Corp., Milwaukee. Highway commission officials approved the technique.

AUTO ENGINE FORECAST— Look for one automaker to come up with an integral casting in iron for water and power steering pumps.

METALS FORECAST—Dr. Robert E. Thompson, head, General Motors Research Laboratories, Detroit, makes these observations:

- We're studying solidification of castable metals to determine its effects on physical properties.
- We're looking for a cast iron in the 50,000 to 60,000 psi strength range that will have the machining properties of a forging.
- We think ceramics have the best properties for future high temperature resistance applications.
- Does copper improve cast iron ductility? Yes, but it's questionable whether the added cost is worth the minute improvement.

PRESS AUTOMATION TREND— General Motors' Fisher Body Div., Detroit, is laying out a sliding bolster press line on which single instead of double bolsters are featured. Object: Space savings. Fisher figures it's no more costly or time consuming to work an overhead crane to replace dies than to tie up an additional 50 per cent of productive floor space.

A 'MUST' FOR BERYLLIUM— To obtain a fine grained, sound, cast beryllium ingot, you must have a fast cooling rate, states Beryllium Corp., Reading, Pa. How to get such cooling most conveniently is the subject of current investigation by the Air Force.

ARMY CHECKS ARMOR METAL— A report by Henry P. George, Frankford Arsenal, Philadelphia, draws these conclusions about the comparative merits of aluminum, titanium, magnesium, and plastic armor: 1. Aluminum alloys are superior to steel and titanium in resisting high velocity fragments (it's the other way around for low velocity fragments); titanium is better than steel for all fragment velocities; magnesium shows promise as armor; plastics are useful for stopping small fragments traveling at low speeds (good body armor); there is not much difference between weldable aluminum and 2024-T4 alloy for fragment protection.

CRYOGENIC DISCOVERY—Increasing the oxygen content of titanium alloys (6A1-4V and 5A1-2.5Sn) which operate at extremely low temperatures (to minus 423° F) effectively lowers their toughness, states Battelle Memorial Institute, Columbus, Ohio.

IT'S A BIG ONE— An unusually large, double action, mechanical press produced for a Michigan firm weighs almost 35 tons and is rated at 3000 tons, states Federal-Warco Div., Warren, Ohio, of McKay Machine Co.

Source: ASTME, Detroit.

BANG! TOOL COST CUT— The milling cutters illustrated are shaped by DynaPak, high energy rate forming machine made by the Ft. Worth (Tex.) Div., General Dynamics Corp. Built conventionally, such tools cost $20 apiece. New price: $7. The firm is working with cutter manufacturers to reduce cost of procuring tools for its 13 numerically controlled cutting machines. Cutters are made of Star Zenith tool steel.

Stirring Discovery Improves Welds

• YOU CAN improve weld deposits with one of the agitation techniques researched by John F. Rudy, supervisor of welding research, and his associates at Armour Research Foundation of Illinois Institute of Technology, Chicago.

Participants at a recent meeting of the American Welding Society learned about several methods that refine the grain structure of welds and probably improve their mechanical properties:

- An electromagnetic field around a welding arc stirs the molten deposit as it solidifies.
- Mechanical vibration tends to break up solid and liquid layers which form during solidification. (It was employed on aluminum.)
- Seeding refines grain structures even better than mechanical disturbance.

Other conclusions suggested by Mr. Rudy's experiments: "The important factor of any molten metal disturber is that it must produce a shear flow between liquid and solid metal layers at the freezing interfaces. That is especially effective if the disturbance is turbulent."

Mr. Rudy also notes that impact is much more effective than a simple "wave shaped" vibration at sonic frequencies. And electromagnetic stirring at times improves porosity.

Tests were done principally on aluminum (5083), Type 304 stainless, commercially pure titanium, 6-Al, 4-V titanium, and an all-beta titanium alloy (13-V, 11-Cr, 3-Al).

• Disturbances, either electromagnetic or mechanical, refine grain structures, increase fluidity to reduce hot cracking, upgrade mechanical properties, and outgas to reduce or redistribute porosity.

Conditions at a liquid-solid interface in a molten pool in the process of solidifying are governed by freezing laws. Mechanical disturbances affect freezing by upsetting composition or heat conditions. As a result, nucleation (the start of a crystal) can be controlled without affecting crystal growth. Mr. Rudy employed magnetic stirring, sound waves, and tiny particles of tungsten carbide.

• Electromagnetic stirring of arc-welds is done with coils around the welding torch and directly beneath the weld pool.

Interaction between the vertical magnetic flux and the horizontal current in the weld pool makes the melt rotate clockwise or counterclockwise, depending on whether you employ straight or reverse polarity. By alternating the coil connections, researchers could stir one way or the other at will.

• Weld metal can be vibrated several ways, but Armour chose to move the base metal or the mold wall. In one instance, the backup bar was struck.

Here are Mr. Rudy's tentative conclusions:

First, you get dendrite fragmentation—solidifying pieces are broken off in the pool by the pressure of the moving liquid. Such particles make ideal nucleants.

Second, viscous shear forces present a greater number of atoms to a subsized nucleus, promoting its growth into a size large enough for a stable nucleus.

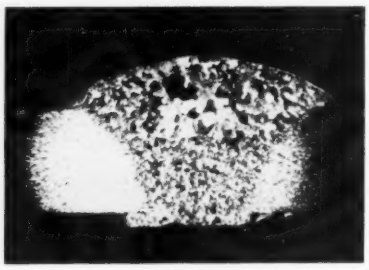
Third, portions of the solidifying melt are mixed to bring about supercooling of small units of the liquid to encourage nucleation. This mechanism depends on eddies.

• Turbulence enhances grain refinement and cuts porosity a little. You can obtain more turbulence if the stirring direction is reversed several times per second.

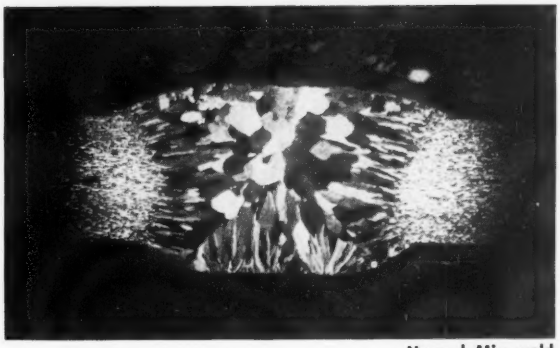
To obtain some porosity for the studies, researchers bubbled inert gas through water. Evidence indicates that although stirring doesn't completely eliminate porosity, it will redistribute the pores, change their size, and reduce their number. Still unanswered: How much such changes affect weld properties.

A type of porosity often found in aluminum is at the center line of welds. It seems to be associated with aluminum oxide films on abutting surfaces, states Mr. Rudy. Such films aren't broken up and dispersed by welding even though metal on either side of the film is completely melted. Stirring evidently disrupts the film and thus eliminates the porosity.

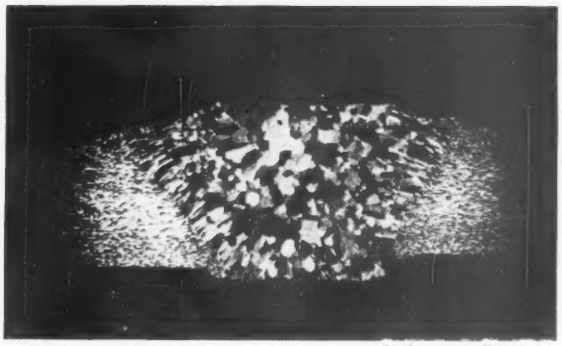
• Some undesirable side effects can be produced in an arc by a magnetic stirring field.



Grain size reduction by impact vibration alone is limited: Marked grain refinement goes only halfway, although it's better than none

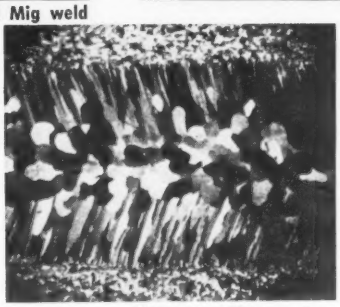


Normal Mig weld

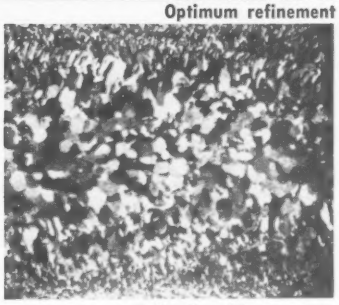


Optimum refinement

Here's how much grain refinement you can expect: Microstructure at left (above) is normal weld in aluminum. Field strength of 200 gauss, plus reversing field polarity seven times a second, produces the refinement at the right. Below: Top view of those structures 1/16 and 1/32 in. below surface



Normal weld, top view



Refined weld, top view

In general, welding that tends to be unstable will be made more so by a magnetic field. Stable arcs are little affected, says Mr. Rudy.

For example, in consumable electrode, inert gas shield (Mig) arcs, metal transfers from the electrode to the puddle in large drops at relatively low current densities. As they fall, the drops are rotated rapidly by the magnetic field. Thus expelled centrifugally, they are lost as spatter. By increasing the current density, smaller drops are produced; the arc becomes more forceful; and the effects are decreased.

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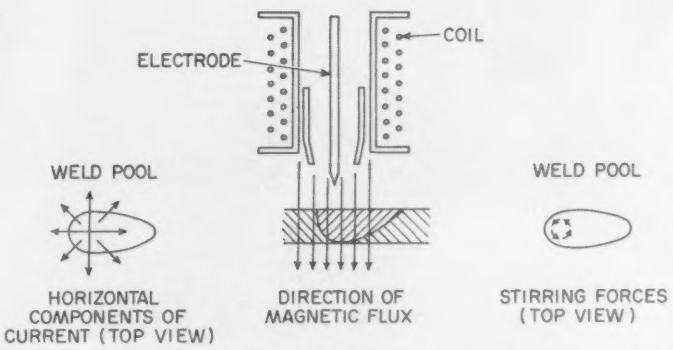
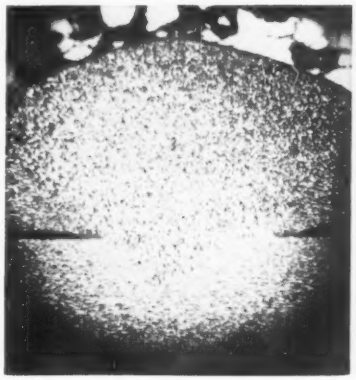
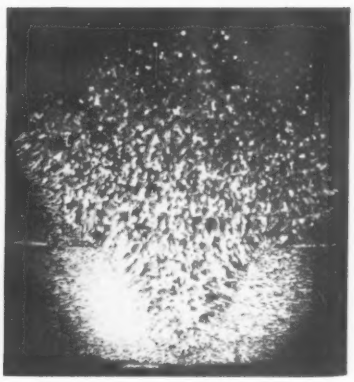
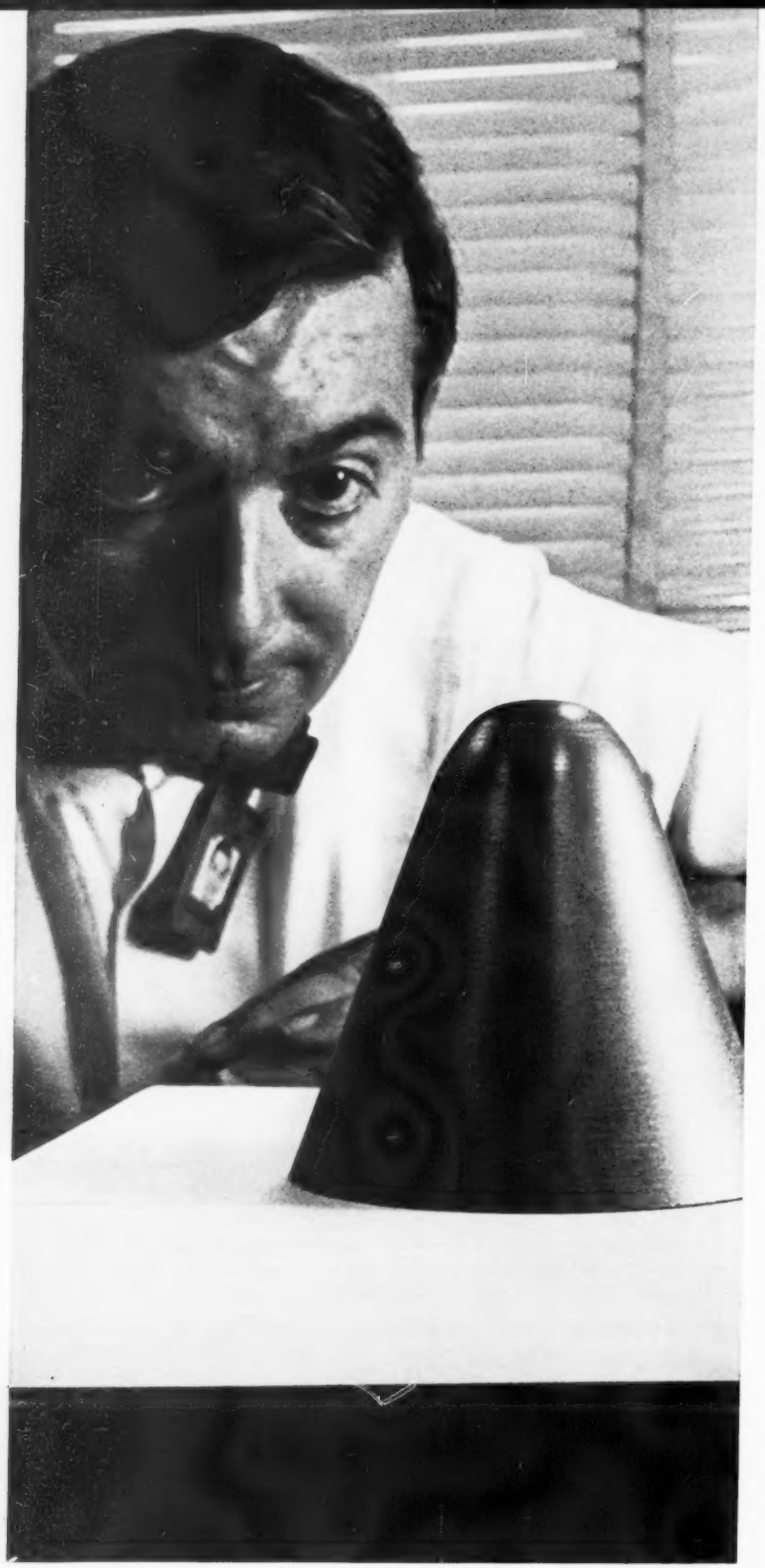


This arrangement does the weld stirring electromagnetically. Torch is surrounded by coil; another coil is placed in line just under the weld. Important points: Magnetic strength and field reversal

Fine particles of tungsten carbide added during solidification of weld zone, combined with stirring, produced maximum grain refinement, Armour found. (Unstirred example is at the far right.)







Cone made from one of the new beryllides developed by Brush Beryllium can be made by any one of several metal powder techniques, including plasma arc spraying. Such materials, called intermetallics, have top operating temperatures about 50 per cent above available structural materials (10 hours at 3000° F). The compounds resist oxidation at high temperatures distinguishing them from molybdenum or tungsten, says Brush Beryllium. The firm "builds" the materials by reacting beryllium with tantalum, columbium, or zirconium in a vacuum

Beryllide Family Headed for Pleiades

• A NEW FAMILY of Space Age materials, beryllides, has been developed by Brush Beryllium Co., Cleveland. It heralds them as a significant advance in the search for materials that will withstand extremely high operating temperatures.

Called intermetallics, they are made of beryllium combined with tantalum, columbium, zirconium, or similar refractory metals.

These are some of the important features:

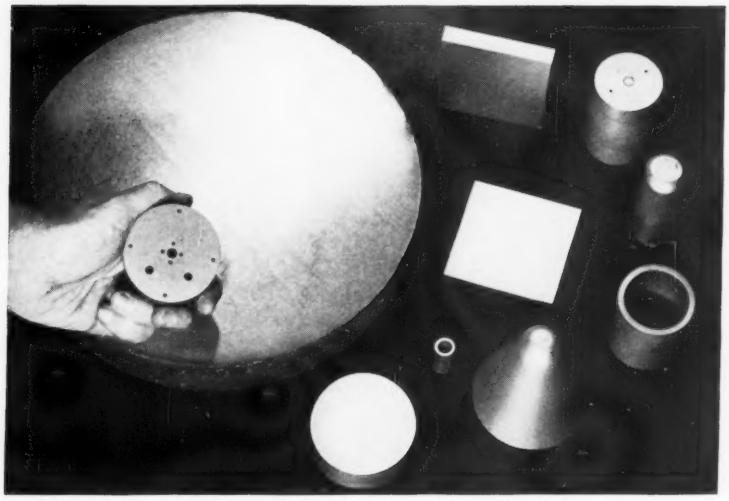
- Beryllides can operate at 3000° F for 10 hours.
- They have more than ten times the strength of ceramics at lower temperatures.
- They are extremely resistant to oxidation. (That and weight are comparable to ceramic properties.)
- Top use temperature of the beryllides is said to be 40 to 50 per cent greater than that of cobalt, nickel, or columbium-base alloys.

Cost: Less than $150 a pound. Lowering of that figure will depend on production volume, states Brush Beryllium.

• Fabrication techniques include vacuum hot pressing of powders, cold pressing and sintering, investment and slip casting, isostatic pressing, and plasma spraying.

Small parts like rods, tubes, cones, plates, crucibles, blocks, and bars have been made by Brush Beryllium. Scaleups of such shapes are being conducted and results are said to be promising.

Beryllides are extremely hard (see table, right), so machining has to be done with diamond grinding wheels.



Big disc is pressed powder. Flat, small shapes were cold pressed, sintered; other parts were made by isostatic pressing. Larger parts are on way

Brush Beryllium indicates that modulus of rupture values are greatest in the 2300° F range (40,000 to 100,000 psi). Those values drop off from one half to two thirds at 2750° F. Even at that temperature it takes 35,000 psi to rupture a bar of tantalum beryllide (Ta_2Be_{17}).

To put those properties in perspective, compare the breaking strengths (at 2500° F) of the new materials with those of carbides, oxides, and refractory metals. Typical beryllide values are 37,000 to 65,000 psi. Refractory metals and high temperature alloys will break at smaller values. (Examples: Tungsten, 25,000 to 50,000 psi; molybdenum, 10,000 to 15,000 psi.) The carbides and oxides, which have good oxidation resistance, are also considerably weaker. Boron carbide has a breaking point around 30,000 psi; silicon carbide, beryllium oxide, and aluminum oxide break under less pressure.

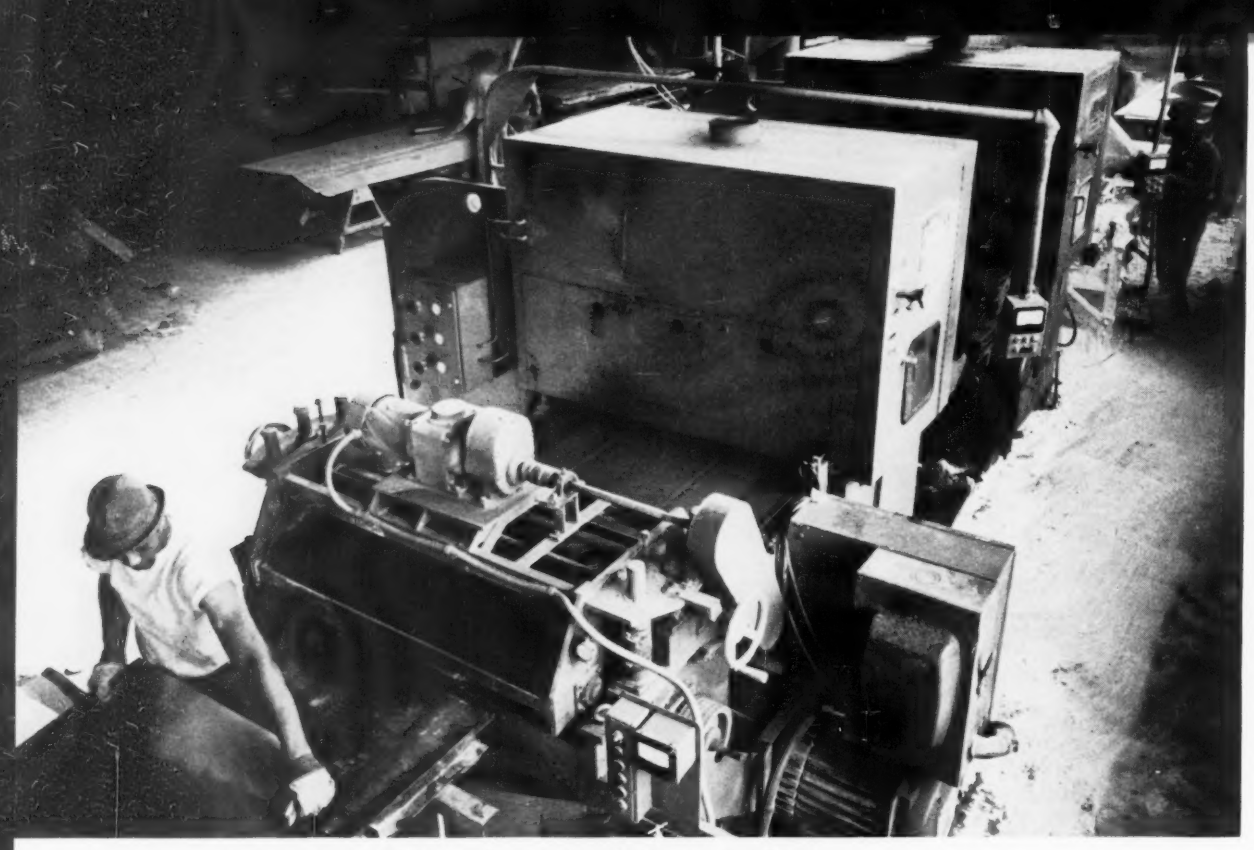
Other physical features: Thermal expansion is similar to that of nickel; thermal conductivity is good enough for the materials to be considered for heat sinks.

• The product is the result of five years of research, supported largely by $1 million in government contracts.

Brush Beryllium says its work is among the first to show oxidation resistance and optimal mechanical properties for such a wide range of intermetallic compounds.

Typical Properties of Beryllides

	Melting Point °F	Vickers Hardness No. (2½ kg load at room temp.)	Modulus of Rupture (Thousands psi) Room temp.	2500 °F	2750 °F	Oxidation (mils penetration in 100 hr) 2500 °F	2700 °F	Elongation at Rupture (%) Room temp.
Columbium Beryllides								
$NbBe_{12}$	3070	500	22	40	22	0.9	2.0	0.1
Nb_2Be_{17}	3100	1000	31	63	36	0.6	1.9	0.1
Nb_2Be_{19}	3100	1050	30	65	27	—	—	0.1
Tantalum Beryllides								
$TaBe_{12}$	3360	720	31	43	26	0.5	0.9	0.1
Ta_2Be_{17}	3610	1120	30	56	35	0.3	0.9	0.1
Zirconium Beryllides								
$ZrBe_{13}$	3500	1000	25	37	25	0.5	1.3	0.05
Zr_2Be_{17}	3600	1130	25	40	35	0.5	1.2	0.1



An operator loads stainless steel sheets for trip through abrasive belt heads

Conveyorized Units Speed Sheet Polishing

• "STAND right there," said Tom A. Mallan, president, Main Steel Polishing Co., Bronx, New York, to the truck driver who had brought in a "rush" order. About 20 minutes later, the order was ready—ten sheets of polished stainless. A new line of abrasive belt polishing machines makes such service possible.

Normally, the job cited by Mr. Mallan—giving the ten sheets of stainless a No. 3 polished finish—would take longer than 20 minutes just to set up.

He feels the new machines make his firm more competitive than it could be in any other way.

• Deliveries faster than customers are yet used to, the ability to do jobs not possible on old machines, and reduced capital and labor costs—those are some of the more important plusses Mr. Mallan can now offer.

Seventy-five per cent of Main Steel Polishing's business consists of providing abrasive belt polished metal sheets to steel warehouses. The balance goes to large fabricators, particularly those making kitchen, hospital, and similar equipment. Most of the orders are for stainless, usually AISI 302 and 304.

• Sheets are fed at a rate of 40 ft a minute.

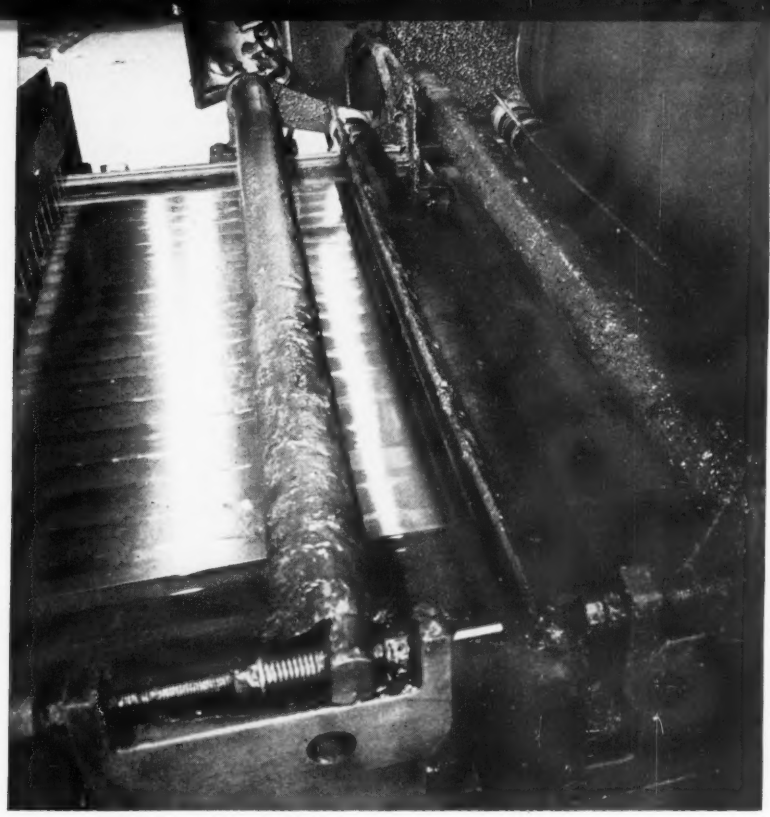
One pass down the line (using 100 grit belts) produces a No. 3 finish. To obtain a No. 4 finish, the sheets are run through a second time using 180 grit belts. Belt change takes only a few minutes.

Mr. Mallan says: "The cost of the complete line is about the same as that for one big pinch roll grinder—yet we have the advantage of multiple stands so we can complete the work in just one pass. It used to take two or more passes in the pinch roll grinder, with added handling.

"We're averaging 400 to 500 polished sheets per 8 hour shift. On a pinch roll grinder, we got 175 to 200 sheets in the same period, and with a flat bed machine we could get 80 to 100. Thus, at no increase in initial equipment cost, we've at least doubled our productive capacity. With the planned addition of handling equipment to get the sheets onto and off the line, we will be able to boost our capacity to 1000 sheets a shift.

"That productive capacity gives us two of our most important gains. First, we can promise 24 hour delivery on any job of less than 100 sheets. Second, the increased efficiency and lowered handling have helped reduce our labor cost per sheet. The reduction in handling also has reduced our costs due to damage."

Another important advantage: Mr. Mallan's firm can process pieces as short as 14 in., the distance be-



Sheet, streaked with oil lubricant enters the final polishing station. Rotary brush takes off any grinding dust that may be left from the preceding machine

tween hold-down rolls, against a previous minimum of about 60 in. Also, parts or blanks can be processed.

The new machines use relatively short (103 in.) belts. Yet, because the productivity of the line permits more efficient scheduling of jobs, belts can be better utilized, and belt output is about equal to what it was before. "This has cut our abrasive cost by about 50 per cent," Mr. Mallan says.

• Sheets go through the line on a series of conveyor belts.

The first machine belt finishes the underside of the sheet. Generally, this is done for the purpose of cleaning and stress relieving. The sheets then go into the first grinding machine where the abrasive belt (paper backed, glue bonded) makes its initial polish pass. Hold-down rolls on each side of the belt head keep the sheet flat on the conveyor. To further assure a tight fit on the conveyor belt, it can be ground by the abrasive belt. Before the sheet enters the second grinding station, a brush clears the surface of any residual grinding dust and the sheet is oiled to provide the lubricant for the finish polish. The final machine has a pop-up platen. Sheets enter low in the belt area, are lifted into contact with the abrasive, then lowered again on exit. That prevents the leading or trailing edges of the sheet from tearing or scoring the belt. Control of the platen is close enough to bring the polished surface within a fraction of an inch of each end.

The line was manufactured by the Machinery Div., Carborundum Co., Niagara Falls, N. Y.

Combination Press Halves Labor Cost

• A BACK-TO-BACK hot and cold molding press combination works as two separate presses, but requires half the labor. Production is automatic from loading to unloading.

The combination consists of a 450 ton hot press and a 100 ton cold press in tandem that can mold laminated plastics, rubber, grinding wheels, plywood, or other material requiring a heating and cooling curing cycle. Designed by Birdsboro Corp., Birdsboro, Pa., the company reports it can build capacities from 100 to 10,000 tons.

• Each unit has a 24 x 24 in. working area with five or more openings for work insertion.

Five or more molds can be pressed simultaneously. Any of the five openings can be selected by pushbutton for loading or unloading. For further flexibility, either press can be operated independently.

• Tracks for conveying the load and unload racks are located across the front and rear of the presses.

Four elevators, at the terminals of both track sections, raise and lower the racks for progressive loading and unloading. The two loading and two unloading stations are fed by four roller conveyors. Each loading rack can rotate to get work from either conveyor. Fork trucks are not needed for moving work to the presses.

• One man at each loading station loads the work.

A pushbutton lowers the loading rack on the elevator. Molds and laminations are then loaded in the openings, one at a time, as the rack rises on the elevator. After the rack is loaded, a pushbutton control moves the rack on the track to the center of the press where it locks in place (press loading position).

Next, the hot press opens automatically. The loading rack automatically pushes the work into the corresponding press openings. The molds entering the hot press force the hot work already there into the cold press. Similarly, the work in the cold press is ejected by the incoming hot work onto the unloading rack positioned at the exit side.

• When all the work is cleared, the presses automatically close.

A pushbutton control then returns the empty loading rack to its original position for reloading and moves the unloading rack (with its finished work) to its original unloading station.

In reversing the procedure, the molds are unloaded onto one of two flight conveyors at each station from bottom to top of the rack as it descends on the rack elevator.

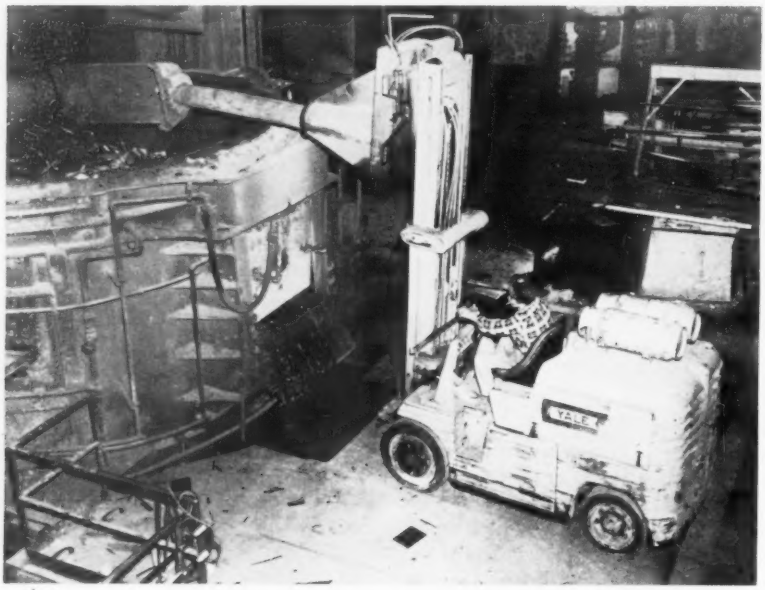
Lift Truck Outfitted for Fast, Efficient Charging

• ONE LIFT TRUCK and one operator replaced five men with shovels on an electric furnace charging job at Midvale - Heppenstall Corp., Philadelphia.

The truck, adapted by Yale Materials Handling Div., Philadelphia, Yale & Towne Mfg. Co., is gasoline powered. It carries a 133 in. rotating ram measuring 12¾ in. at its base and 8⅝ in. near the end. The end of the ram is fitted with a peel. Inside dimensions are 28 x 50 in.

The truck is a compact design with a turning radius of just over 100 in.

The furnaces served are in a modernized portion of Midvale's 78 acre plant. They turn out highly specialized, clean steels for precision applications in missiles, jet engines, heavy duty turbine shafts, pressure vessels, and other critical parts.



Electric furnace charged topside or through door

• Controlled blends of alloys are transported from stockpiles by the truck, run through the furnace door, and dumped (by rotation) into the center of the heat.

Total carrying distance is about 35 yd. Formerly, workmen made several trips to transport several hundred pounds to almost a ton by wheelbarrow and had to stand close to the hot furnace to shovel the material through the doorway.

In cases where minute additive tolerances must be met, the truck is routed over a weighing station on its way to the furnace.

• The truck can also top charge the furnace—releasing a large crane for heavy duty work. It does the job easily and more efficiently.

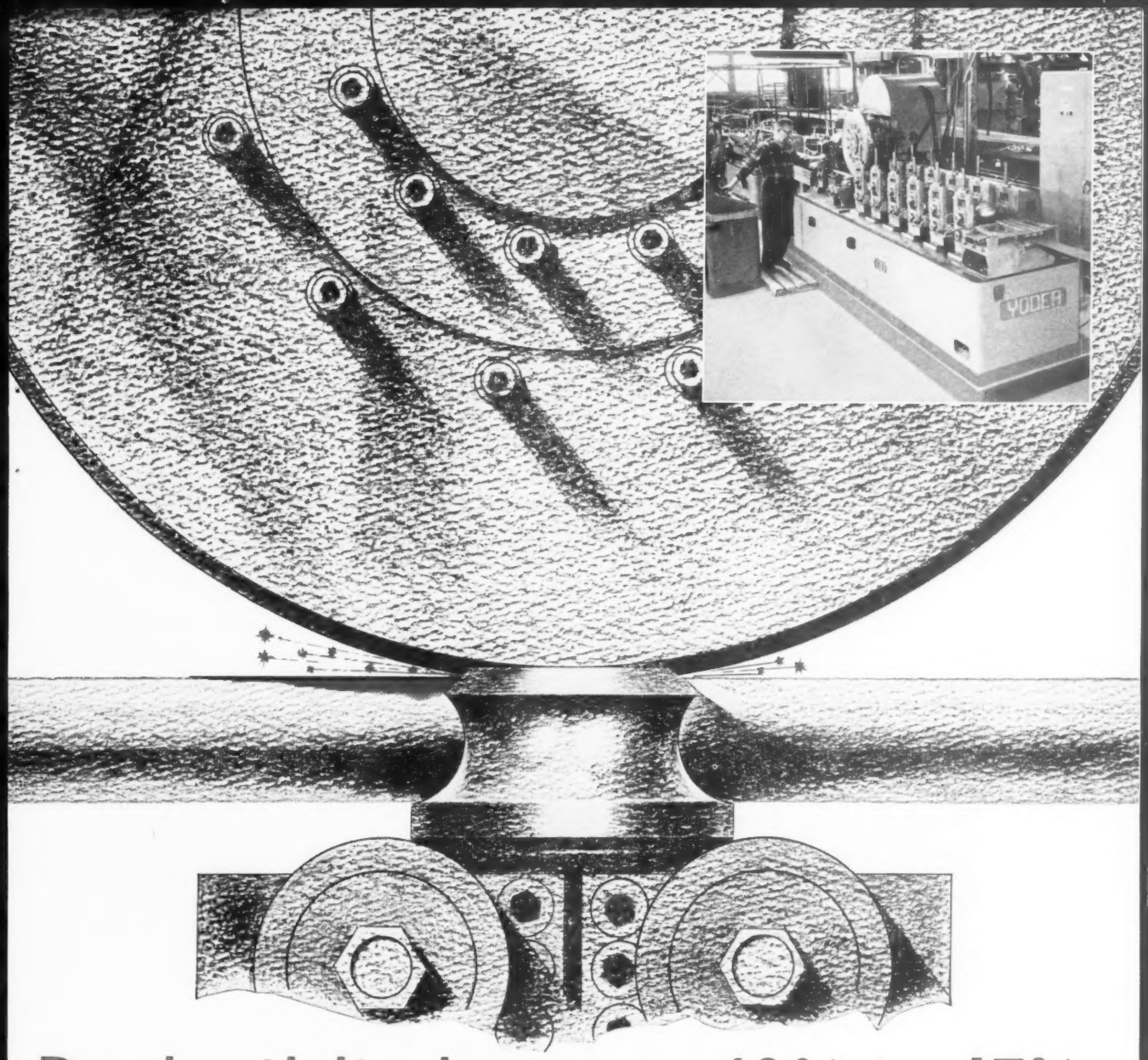
The job is well under the crane's capacity.

The ram and peel are raised to full truck mast height and maneuvered over the furnace for dumping.

When not charging furnaces, the truck fills crane buckets (previously loaded by shovel crews) with materials such as Syndolag. The furnaces use the material in ton quantities.

The truck is also used as a battering ram to knock material away from the furnace door. (The material must be moved into the center of the heat to keep the door clear for charging and to assure a proper alloy mix and to prevent waste.) The cleaning was previously done manually with long pokers.

The peel and ram attachment on the truck can be quickly disconnected from the fork carriage and fitted with a pair of forks to move palletized loads or skid platforms weighing up to the full truck capacity of 16,500 lb.



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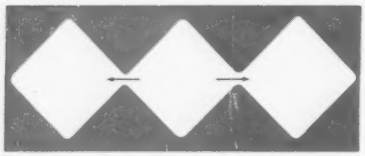


Molten metal flows into all cavities

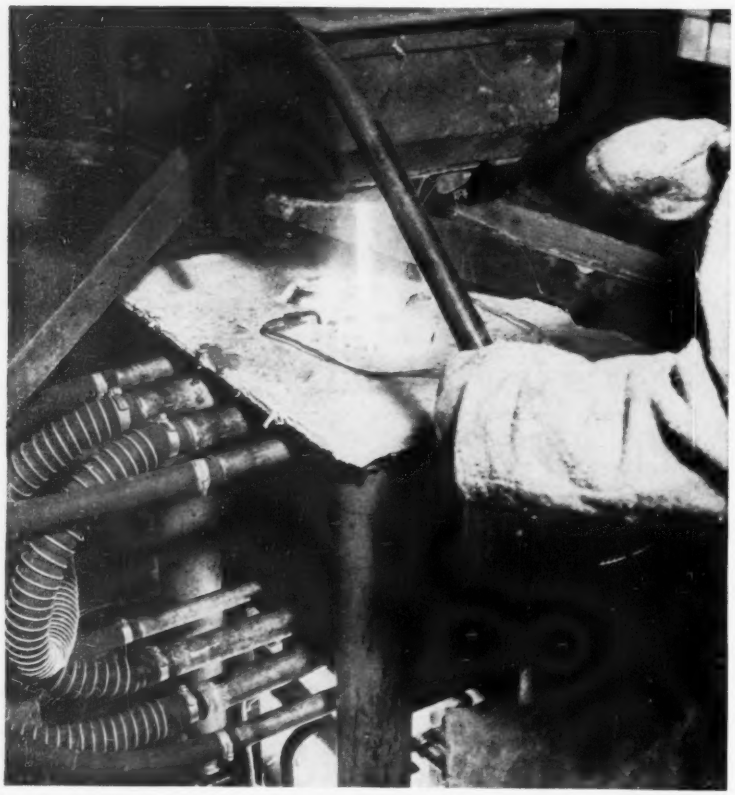
Multiple Mold May Boost Bloom and Billet Output

• CONTINUOUS CASTING in a multiple mold may put production tonnage of billets and blooms on a par with that of continuously produced slabs. The method, called the Weybridge process, was developed in England by the British Iron & Steel Research Association (BISRA), London, and Continuous Casting Co. Ltd., Weybridge.

The process was described in a British publication, the *Iron & Coal Trades Review*, by J. Savage, technical director at Continuous Casting Co., and J. Pearson, assistant director of BISRA.

• Fewer casting strands are required for a given tonnage than with conventional molds. And higher casting rates improve process reliability.

The mold, which features a series of square cavities in a corner-to-corner, in-line configuration, is so designed that molten steel can flow freely from one compartment to another. The steel is poured from a central tundish nozzle into the center mold cavity, from which it is distributed to the outer sections. (The process could be modified to employ more than one nozzle.)



Single tundish stream fills three sections of continuous casting mold

Casting rate per strand is said to be trebled with a three cavity mold. Blooms 8 to 10 in. square can be cast at a rate of 50 to 60 tons per hour.

The process is said to minimize machine stoppage, usually attributed to blocking of the tundish nozzle, or lack of stability in the metal stream, when lower pouring rates are employed. Nozzle and tundish are said to require less preheating, so that fuel consumption is lower and refractories last longer.

• Lower capital and operating costs are promised per ton of steel.

Personnel requirements for operation of a continuous casting machine are related almost directly to the number of pouring positions and cutoff stations and to the amount of disposal equipment required, say Messrs. Pearson and Savage. That makes the multiple mold method attractive in terms of over-all costs.

Some of the savings obtained by using fewer strands are offset by the need to part cast sections. But the parting costs are said to be modest. The sections may be separated by a rolling pass, with a saw, or by flame cutting. Parting of the sections in the vertical position (while the ingot is in the casting machine) is feasible but wouldn't be any more practical than separation after disposal.

The multiple strand could be bent below the withdrawal rolls, as is done with single square sections. Radius of curvature wouldn't have to be any greater than for single sections.

• Preliminary static tests helped determine mold shape and feed speed.

Early static tests were made with a steel mold containing three, 3 in.

THOMPSON oil tempered and specialty wires

Thompson's Oil Tempered Wire is different; it's made to your specifications, designed to do your job efficiently and economically; made by workmen at Thompson who know the business, and are anxious to produce wire that guarantees you product satisfaction. It can be furnished in round, flat and shaped sections.

Test Thompson wire for quality, uniformity and fatigue and see for yourself the difference.

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Bright Oil Tempered is high in fatigue, uniform in temper, try it for your product"
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Liquor Finished Wire—all carbons—is uniform in size, physicals and color"
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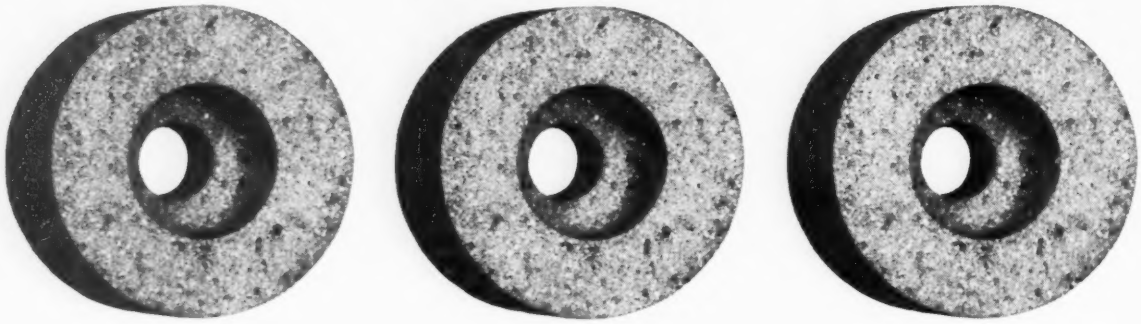
POSITIVE DUPLICATION—EVERY TIME!



Each one of these kernels of corn has positive duplication built into it, just as have these internal wheels, and *all* CINCINNATI (PD)° GRINDING WHEELS. There are good reasons for this (PD) dependability . . . 36 good reasons.

FAMOUS, UNIQUE PROCESS

Three dozen unvarying quality controls govern every step of the famous Cincinnati (PD) manufacturing process, unique in the industry.

For example, the atmosphere of the mold room is *climate controlled* with conditions of temperature and humidity that *remain the same* from hour to hour, from day to day, from year to year!

RESULT: UNSURPASSED UNIFORMITY

This extraordinary attention to manufacturing detail results in wheels of unsurpassed uniformity. You can reorder CINCINNATI WHEELS with confidence, because they give you the same good job time after time. You use fewer wheels because (PD) wheels last longer.

CALL CINCINNATI TODAY

Factory trained by the Cincinnati Milling Machine Company, our grinding specialists are available to you for consultation on all your grinding problems. Call your CINCINNATI GRINDING WHEELS Distributor, or contact us direct, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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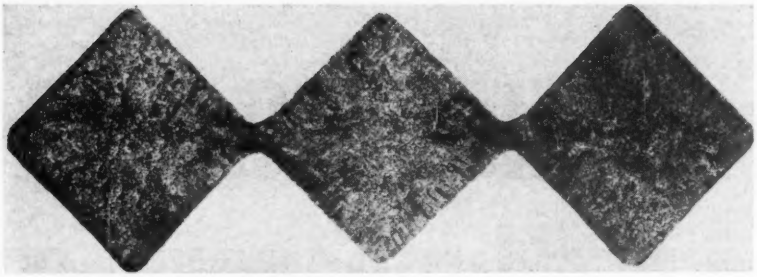
°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



Weld, in chill zone of casting, breaks apart to yield individual square sections

Composite bars are ready for separation by rolls, saw, shear, or flame cutter

square cavities. Ingots were stripped after a relatively short solidification period—about the same as the freezing time in continuous casting.

The tests helped confirm earlier calculations on the proper feeding of liquid steel through the short, narrow channels between cavities. They also helped the researchers learn about structure of the steel in the area near the webs—whether it was suitable for subsequent parting and rolling. It is extremely important that cuts be made through the "chill" zone for satisfactory processing of the bars. Tests also indicated that ingots wouldn't crack internally or on the surface in the area of the webs.

• Further tests—on a pilot scale—prove the mold design practical for industrial use.

A triple, 3-in.-square mold was designed by Continuous Casting Co., and many runs were made on an experimental casting machine at BISRA's Sheffield laboratory. Results were satisfactory from the start, and they proved that multiple mold casting was feasible.

The quality of as-cast material confirmed promising results of earlier static tests. The cast material showed no sign of internal or surface cracking, and none of the sections was distorted. Further tests are being made on the parting and rolling of the sections.

The process is being employed for casting low carbon steel on a large scale pilot machine of the Centre National de Recherches Metallurgiques, Charleroi, Belgium. A mold is being fabricated for production of 5 in. blooms, which may be cast at 35 tons per hour (on one strand).

Use of the process for casting high alloy and specialty steels is to be investigated by Low Moor Alloy Steelworks Ltd., Low Moor, Bradford.

Wide Use Seen for NiTi Alloy Group

A CLASS of nonmagnetic, nickel-titanium alloys developed by the U. S. Naval Ordnance Laboratory, (White Oak, Md.) has a variety of advantageous properties.

The Navy suggests applications in temperature sensing devices, space and aircraft components, chemical handling equipment, cutlery, jewelry, auto trim, nonmagnetic watch parts, and nonmagnetic tools.

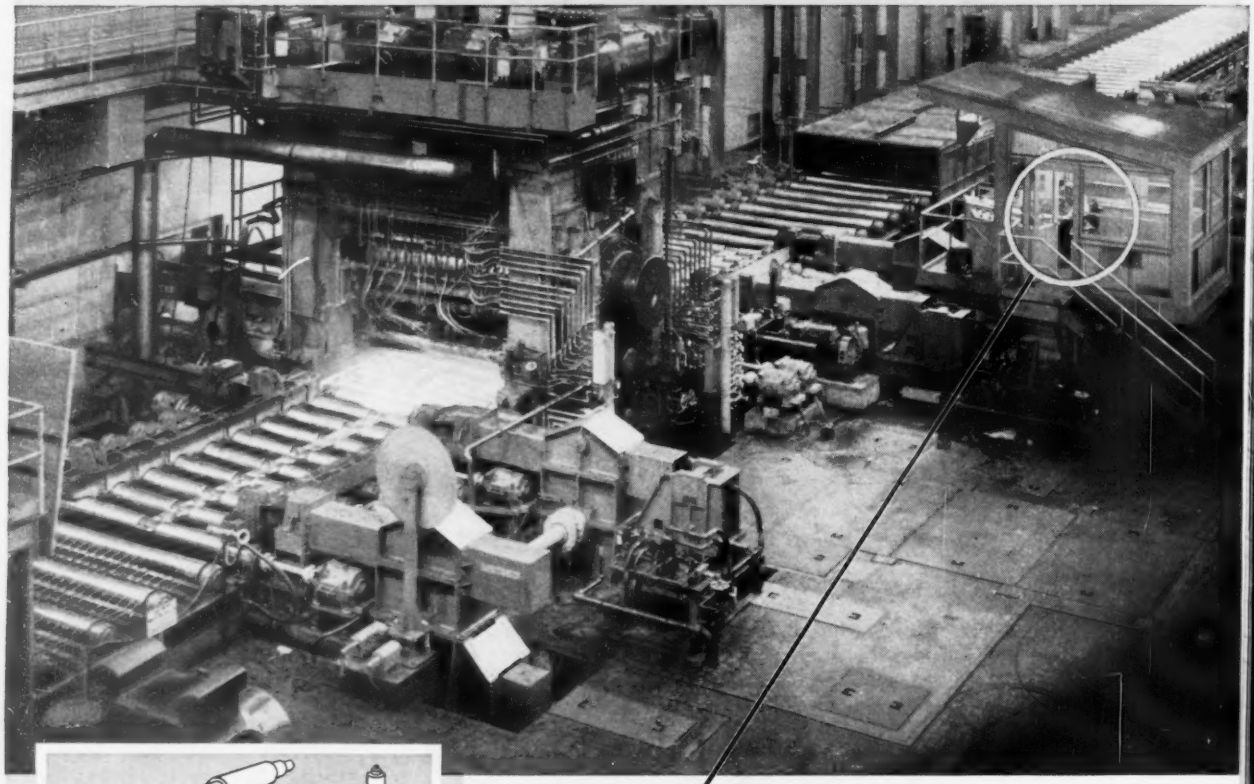
The alloy is called Nitinol. It's corrosion resistant, can be hardened to 62 Rockwell C (almost the hardness of tool steel), and has been tested up to 43 ft-lb impact strength. Its toughness increases as temperatures decrease, yet the alloy is suitable for use up to about 1200° F. With a specific gravity of 6.45, the material's strength to weight ratio is suitable for aircraft and similar applications. Nitinol has a high mechanical vibration capacity at room temperature, which decreases rapidly as temperature is increased. The material can be hardened, welded.

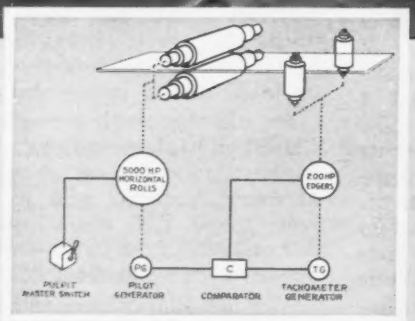
• Technical Details — The Nitinol series consists of TiNi and its associated phases Ti_2Ni and $TiNi_3$. The most phase pure TiNi composition has about 54.5 per cent nickel (by weight). The composition (body-centered cubic crystal structure) has good room temperature ductility and melts at about 2372° F. The room temperature mechanical properties of the TiNi phase (hot worked) indicate ductility as high as 15 per cent tensile elongation and up to 28 ft-lb of impact strength.

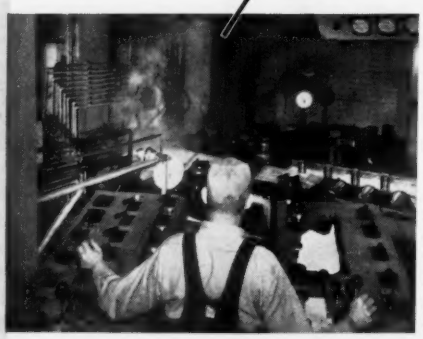
An ultimate tensile strength of 124,000 psi has been measured. Hot hardness measurements reveal a secondary hardening peak in the rapid cooled TiNi alloys between 800 and 900° F. Useable strength appears to go up to about 1200° F.

TiNi base alloys with excess nickel can be hardened to 62 Rockwell C by quenching from 1832° F. The quenching mechanism apparently consists of trapping a finely distributed $TiNi_3$ phase in a TiNi matrix. Hot hardness measurements made on quenched, nickel-rich alloys showed a marked improvement over phase pure alloys up to 900° F.

EC&M-controlled 130-inch helps produce world's







• The EC&M screwdown controller on this mill is operated directly by the roller, is adaptable for auto-positioning and automatic sequencing control in the future.

• EC&M has built and is building control systems for automatic operation of screwdowns and side guides through punched cards or slider-contact panels. Systems which tie in auxiliary and main drives under a single push button automated operation are also available.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

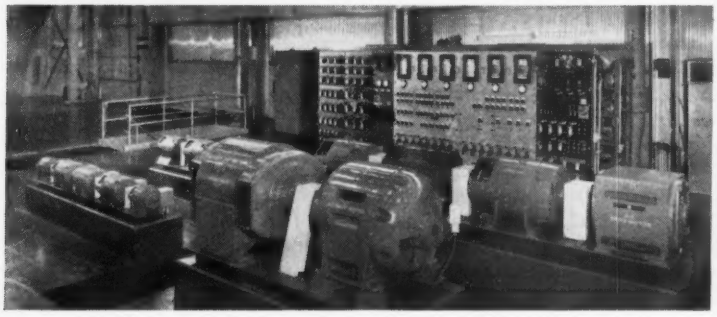
Reversing Rougher widest aluminum strip

THE WIDEST aluminum coiled sheet ever made—115 inches—is produced at Reynolds Metals Company's Alloy Plant in Sheffield, Alabama. Control for the 130-inch reversing hot mill was engineered and built by EC&M.

Operated by a single man in the pulpit, this new mill installation quickly attained full production. The EC&M control system provides the speed matching and draft compensating requirements of both the main and vertical roll drives. The use of existing rotating equipment resulted in extra economies, and drives were computer-analyzed to assure an accurately designed control which would require a minimum of tune-up time.

EC&M is prepared to build complete control systems for reversing and non-reversing mill drives, including the associated mill auxiliary drives. Let EC&M help solve your mill control problems.

All apparatus shown below, including M-G sets as well as screwdown and adjustable voltage controllers, was supplied by EC&M. Complete computer analysis enabled control equipment to be matched exactly to rotating equipment, helped get production under way quickly.



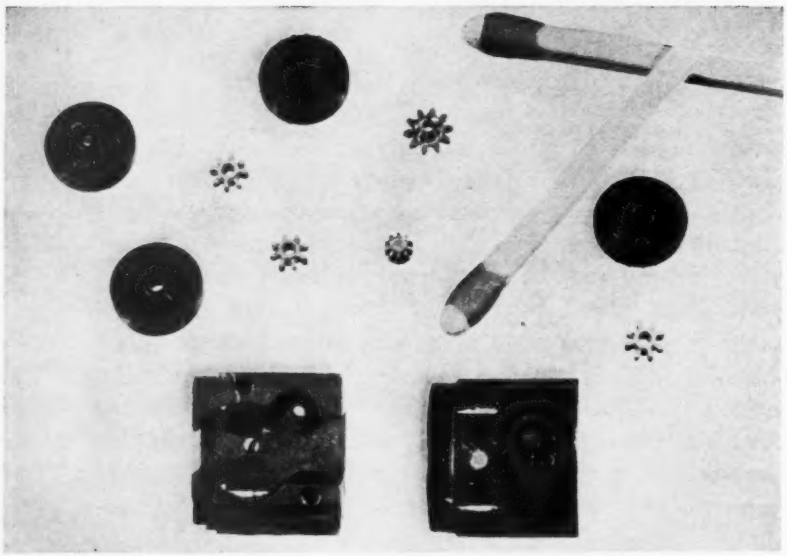
SEND FOR BROCHURE 6609.55

It gives complete details on this installation. Write Square D Company, EC&M Division, 4500 Lee Road, Cleveland 28, Ohio

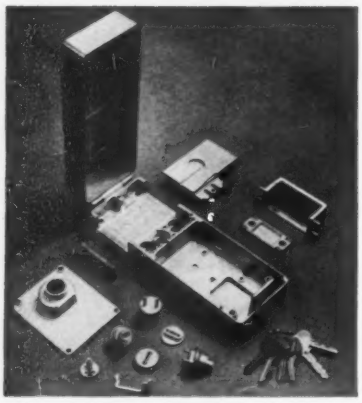
wherever electricity is distributed and controlled

7065

Ten Winning Diecastings Show Versatility of Zinc



A tiny counter assembly was the top prize winner in New Jersey Zinc Co.'s annual competition. Nine awards of distinction are also shown on these pages



Time recording door lock

Instrument print wheel

• SAVINGS of 91.5 per cent were achieved by the zinc diecasting of the year in the annual competition sponsored by New Jersey Zinc Co., New York.

The subminiature counter assembly is smaller than a dime in circumference. It was made by Hadlock & Temte Inc., Chicago, for Bowmar Instrument Corp., Ft. Wayne, Ind. Melvin E. Guillaume (of Bowman) and Donald H. Hardey (of Hadlock & Temte) were awarded prizes for the design and production of the casting at the annual meeting of the American Die Casting Institute in Chicago.

• The winning assembly consists of a two piece housing, four counterwheels, and five tiny gears. (For example: A ten tooth bevel gear 0.063 in. high.)

All openings in the housing are diecast, even the small crescent shaped slots in the sides which permit the outermost gears to clear the housing walls. Tooling costs for the 11 castings amounted to $14,000—the company expects no difficulty in amortizing them at present production rates.

Awards of distinction were also presented:

• A ventilation louver is functionally superior to the previous part; installed cost is cut in half.

The part (for aircraft navigational equipment cases) requires close vane spacing. The contoured ribs are 0.025 in. in wall section. Diecasting permits the addition of flat vertical vanes without costly perforation of the case. The bevel and rabbet frame enable snap action installation and the elimination of spotwelding and other fastening techniques. The fit is said to be tight, vibrationfree. Zamak, a zinc alloy made by New Jersey Zinc, provides castability and

strength for the application. Winners: A. C. Boultinghouse, Withrow Die Casting Co., Hollywood, Calif., and Leonard Maletz, Hoffman Electronics Corp., Los Angeles.

• Replacing a part (print wheel) costing an average of $8.50 with a 35 cent diecasting resulted in a $100,000 yearly saving.

The quality and life expectancy of the part have not been sacrificed. Tooling costs of $35,000 are expected to be amortized within the first five months of production. The manufacturer is able to sell the low cost wheels to its subsidiaries abroad —including those in Japan. Winners: A. Bucher, Springfield Die Casting Co., Kenilworth, N. J., and G. E. Tranter, Brown Instrument Div., Philadelphia, Minneapolis-Honeywell Co.

• A door lock was diecast in Zamak because of flexibility in finishing, castability for close tolerances and sharply varying wall sections, and high strength.

Three single dies and three unit dies can turn out 15 different castings. The result: Valuable production economy. Few secondary operations are needed. Winners: M. E. Johnson, Falconer Metal Specialties Co., Lakewood, N. Y., and Louis Cohen, Phelps Time Recording Lock Co., New York.

• Intricate internal cam surfaces are held to close tolerances in a three piece, diecast assembly.

The part is a Camloc pushbutton fastener. Each cam is diecast with half the internal configuration, then mated to produce a unit said to be economically impossible by any other method. Winner: E. Natkins, Gries Reproducer Corp., New Rochelle, N. Y.

• Fine appearance and design advantages are benefits of diecasting a turret lamp holder for fluorescent light fixtures.

Cast projections permit direct mounting to the fixture without wall brackets. End-to-end fixture mounting is possible. A continuous line of fixtures is assured. A rigid assembly eliminates additional screws and coupling, as well as ganging brackets. Winner: David Morgenstern, Nelmore Mfg. Co., Euclid, Ohio.

• Strength, finishability, and detail are diecast into a Civil War commemorative firearm.

All parts except the trigger, hammer, and handgrips are diecast. The barrel and cylinder can withstand the expansion of burning gases when the gun is fired. The frame for handgrips and the firing mechanism are gold plated. It's claimed that changes in wall sections would be impossible to cast in any other material. Winners: K. B. Morrison, Newton-New Haven Co., New Haven, Conn, and L. R. Knauer, Colt's Patent Arms Mfg. Co., Hartford, Conn.

• Strength, close dimensional control, and cost are important factors in the design of a diecast metal strengthener for a plastic coupler.

The coupler is used for attaching cleaning heads to a swimming pool pole.

(As originally designed, the plastic coupler tended to break or distort under stress.)

The manufacturer uses Zamak. A six cavity insert permits the parts to be broken off at the gate. No additional operations are necessary in the production of the finished part. Winners: Ernest Ike, Western Die Casting Co., Emeryville, Calif., and H. Arneson, Jandy Products, San Anselmo, Calif.

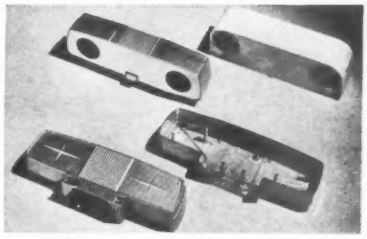
• Rugged precision is called for in a zinc diecast rotor and backplate.

The parts are key components in the Binks memory timer unit. Inside the unit are the rotor (turning in direct proportion to conveyor speed) and the backplate, which is stationary. The rotor has two concentric tracks equally spaced about the diameter of the disc. In the inner track are 90 ball bearings, $\frac{1}{8}$ in. in diameter. Track location must be kept to ± 0.001 in. on both rotor and backplate. Winners: W. G. Treiber, Chicago White Metal Castings Co., Chicago, and Bruno Ensslé, Binks Mfg. Co., Chicago.

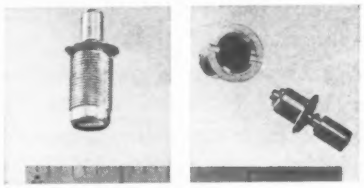
• Features of a Zamak serving cradle: Rigidity and plateability.

The cradle is adjustable and is designed to fit all sizes of Pyrex ware. A single die produces the two identical halves. Winner: Jack J. Punke, Cast-O-Matic Corp., Syracuse, N. Y.

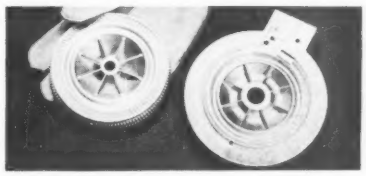
Civil War pistol



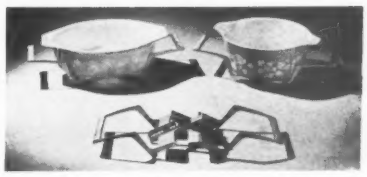
Lamp holder



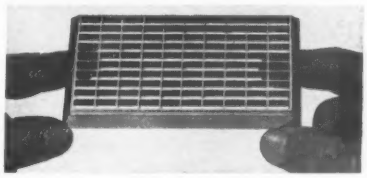
Fastener housing, cams



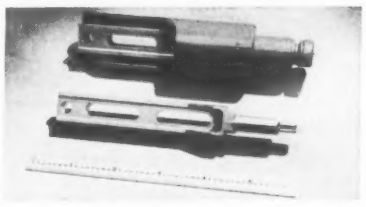
Memory control plates



Adjustable casserole cradle



Ventilation louver



Strengthener for plastic coupler

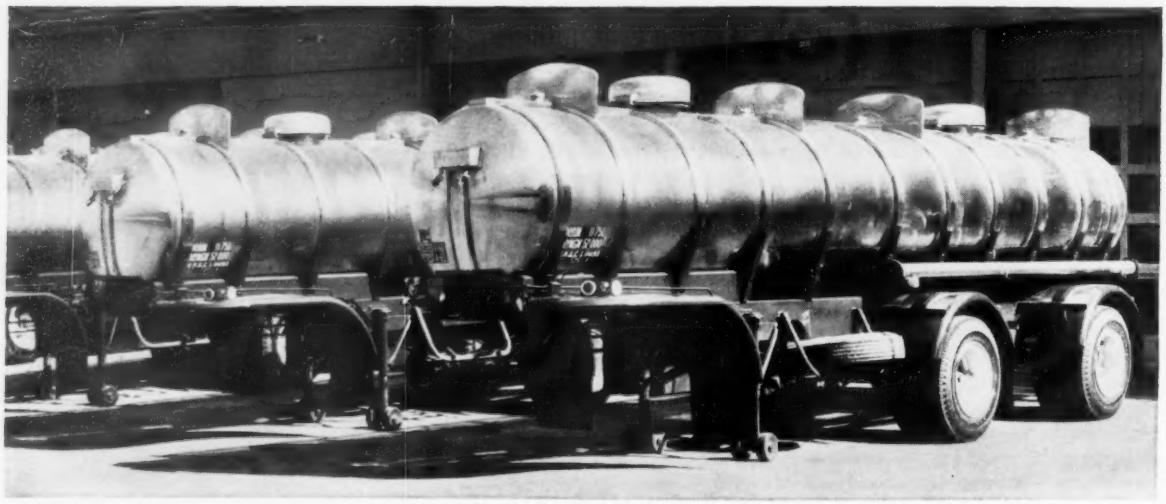
For Stainless Steel, call your nearest Steel Service Center.

Outsmart corrosion with USS Stainless Steel

What's your corrosion problem? Acid? Water? Harsh atmospheres? Solve it with Stainless Steel. Whether you operate a tank truck fleet or manufacture fine paper, whether you specify switch lamps or build skyscrapers, Stainless Steel offers unsurpassed resistance to crippling corrosion.

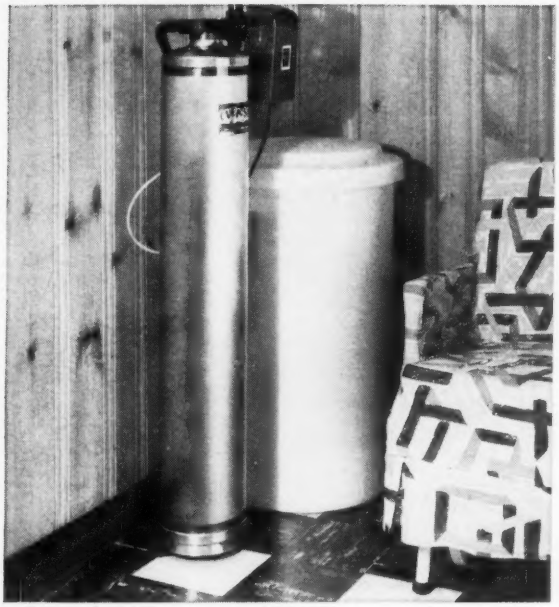
In industrial applications, Stainless Steel resists the corrosive effects of strong acids, so equipment lasts much longer, eliminating premature shutdowns. Stainless is strong, too, so it can be used in critical applications without fear of breakdown. In the chemical industry, Stainless is widely used because it is so easy to clean and does not become contaminated. These same advantages make Stainless ideal for the drug industry (where absolute sanitation is a must) and even for hospital operating rooms (which are almost all Stainless these days).

Stainless Steel can give a product the competitive edge. Its worth to you is far greater than its additional cost because of its excellent corrosion resistance, strength, appearance and superior heat resisting properties. Design quality and long life into your product—design with Stainless Steel. We welcome a chance to work with you when you are planning new products made from Stainless Steel. For more information write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS is a registered trademark.



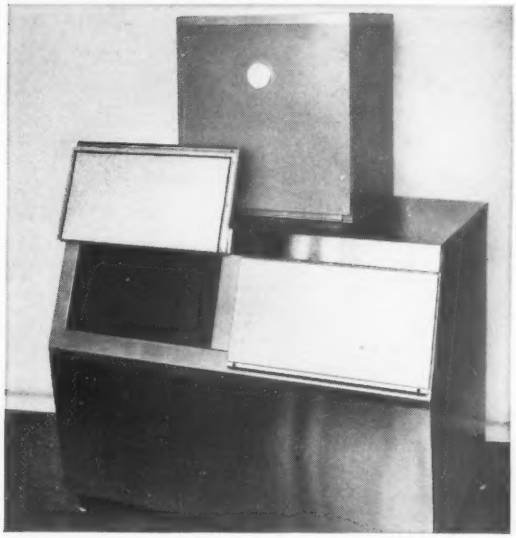
No Stainless Steel tanker has ever worn out.

The tankers here are fabricated from type 304 Stainless Steel, and can carry a variety of acids and chemicals with only a clean-out between trips. No worries about cargo contamination or corrosion, even from many harsh acids. And because Stainless cleans more quickly, the tankers are loaded for the return trip sooner . . . another marketing edge because of Stainless. No Stainless Steel tanker has ever worn out. Tank trailers manufactured by the Tank Division of The Heil Company of Milwaukee, Wisconsin.



How to soften water with Stainless.

This Stainless Steel water softener will last. It is corrosion-proof inside and out. Stainless Steel resists the strong corrosive action of the brine used in the softening process so maintenance is sharply reduced and the tank will last longer. You can install it in your cellar game room and you won't have to worry about appearance because an occasional wipe with a damp cloth will keep it clean and shiny—always. Water softener is manufactured by General Ionics Division of Salem-Brosius, Inc., Carnegie, Pennsylvania.

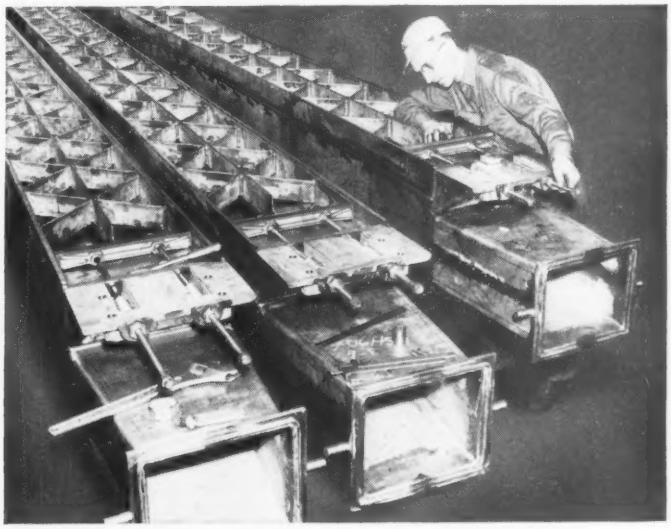


Keep cool with Stainless.

Ice cube bins provide their owners with an assured inventory to meet unpredictable demands. The service of providing ice cubes to the public is full of peaks and valleys of requests. Bins made of Stainless Steel can meet all these situations with steady performance. Inside, they will always be sanitary because they won't corrode and even the harshest cleaning agents won't harm the surface. Outside, their shiny appearance will always stay shiny for the same reasons. Bonus: because Stainless is so strong, it resists the bumps and thumps of hard usage, doesn't dent or "dimple." Ice chest is manufactured by the Roy Follett Corporation of Phillipsburg, New Jersey.

Stainless Steel switch lamps cost the same as cast.

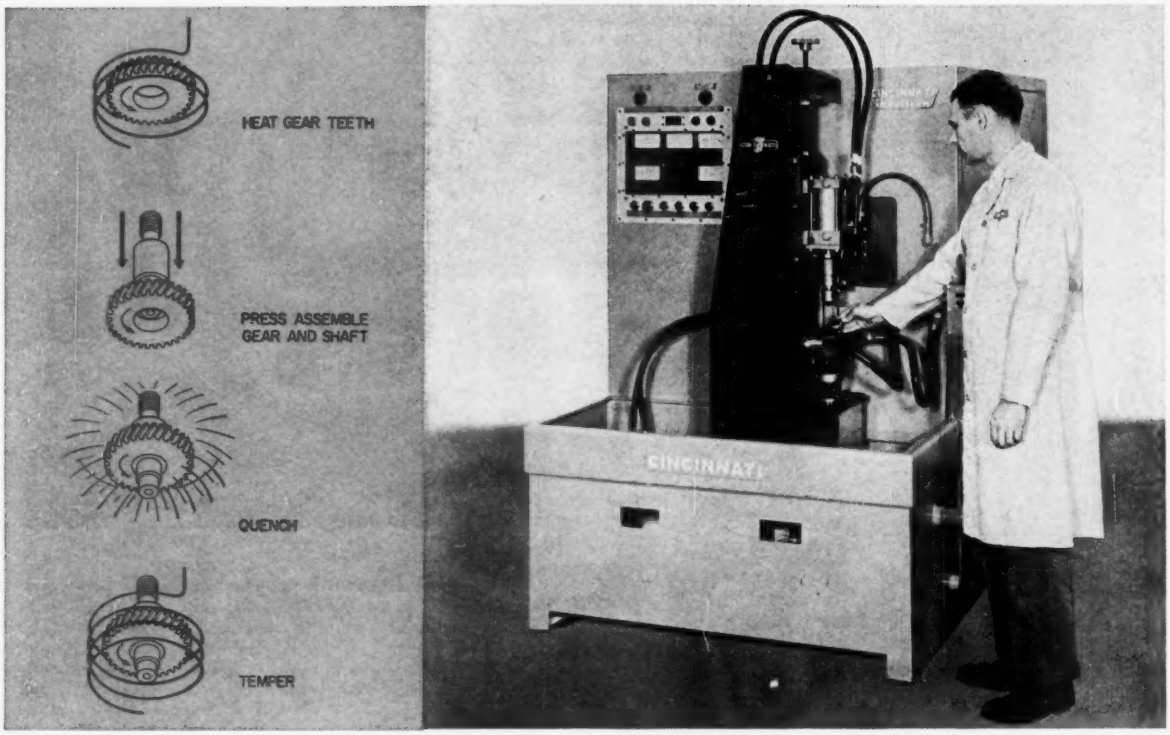
The housing for this railroad switch lamp is all Stainless. It stands out in the weather all year 'round. Many of these lamps have been in continuous service for five years without one sign of corrosion. This lamp is lighter than cast units, yet costs no more. For interior maintenance, the hinged top opens instead of swinging the entire body open as in previous cast lamps. Here dependable Stainless gives a light, first-class housing. Switch lamp manufactured by Lovell-Dressel Co., Arlington, N. J.



Why Stainless Steel is preferred in the pulp and paper industry.

One paper manufacturer puts it this way: "Stainless is used extensively to resist corrosion from acid conditions present in many operations. One important use is for piping pulping liquors. Stainless is preferred for its low cost, cleanliness and ease of maintenance." Papermaking machines are now being built of Stainless because it is the best investment a company can make in terms of long life, corrosion resistance, ease of cleaning and reduced maintenance.

USS **United States Steel**



Less than 15 seconds are required to heat treat and assemble gearshaft components on this Cincinnati Inductron. Cycling is automatic. Loading and unloading are manual

Heat Treating, Assembling Of Gears, Shafts Combined

• GEARS AND shafts are being heat treated and assembled in the same machine at Stanley Electric Tools Div., Stanley Works, New Britain, Conn., to cut the cost of producing such tools as electric drills and power sanders.

Typical assemblies: Gears 1¾ in. outside diameter by ¼ in. thick and (alternate) 1⅞ in. OD by ½ in. thick, fitted to machined shafts.

• Heat pattern on the gear teeth extends below root diameter. The machine press fits the gear on the shaft, quenches the assembly, and then tempers the teeth from a minimum hardness of Rockwell 55 to 40-45 (C scale).

Heat is provided by a Cincinnati 30 kw, radio frequency, Inductron. Versatile and easily changed tooling combines an induction heating coil and a water quench ring centered between two vertical spindles that support the shaft.

The operator hand loads the assembly, slipping the shaft between the spindles with the gear riding loosely on the shaft and centered in the coil. When he presses the start button, the shaft and gear begin to rotate and the heating cycle starts, heating the gear teeth evenly and slightly expanding the blank. During the heating cycle, the air cylinder is automatically actuated, pressing the shaft into the gear.

Following the heating cycle, the quench cycle begins, followed immediately by a reheat cycle at a lower power level to temper the teeth to the required hardness. Total cycle time is 7 seconds for the small assembly and 12 seconds for the larger one.

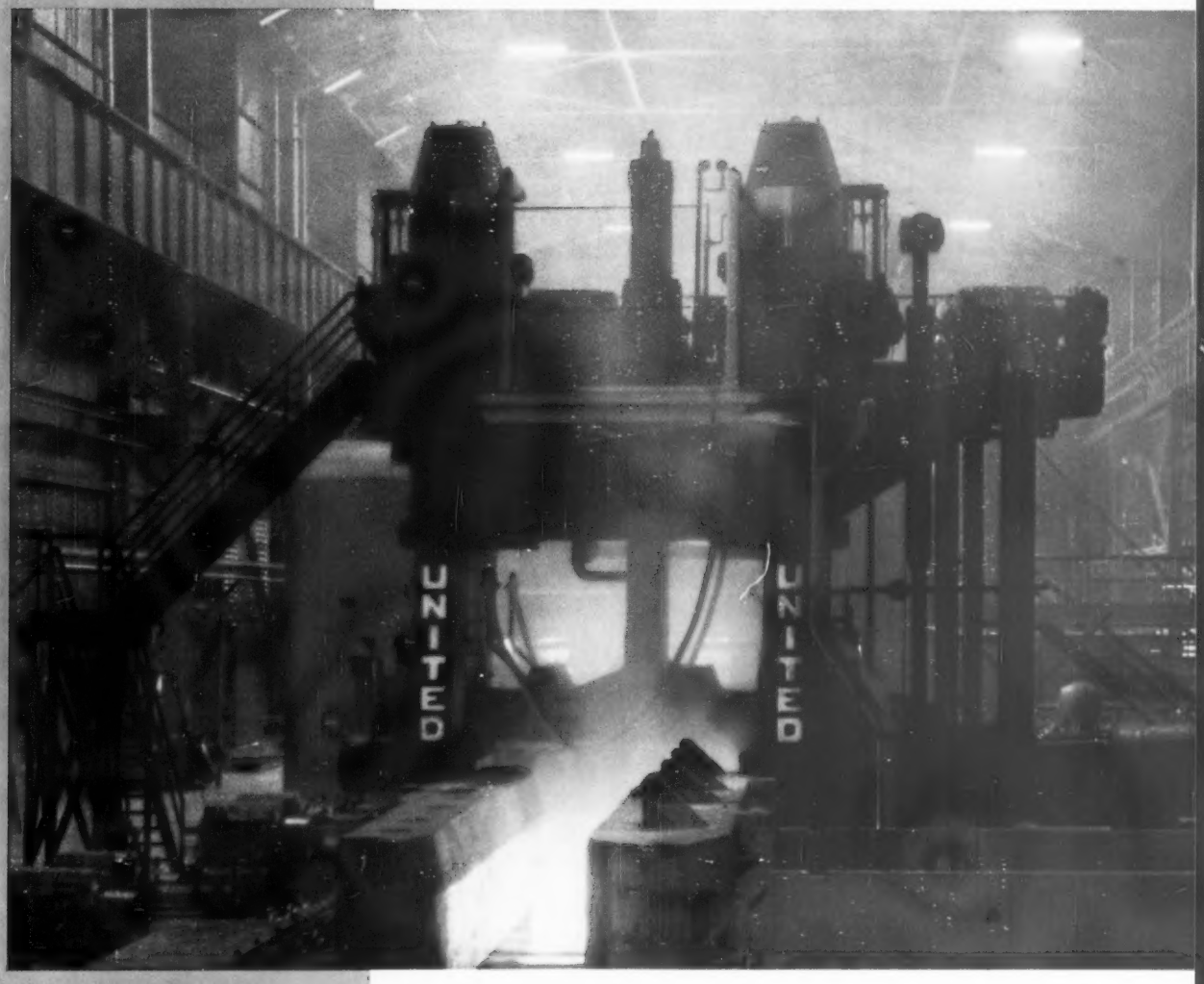
The Inductron uses higher than average frequencies that permit extremely rapid heating confined to shallow case depth. Rapid heating keeps the transition zone narrow and prevents the heated surface from scaling, says Stanley. Distortion, often a major problem, is held to a minimum. No straightening is required.

An electronic rectifier on the Inductron permits power output to be varied, even under load for operations requiring different temperatures in the same automatic cycle. Variable output permits a reduction in setup time and an increase in machine versatility. The operator can preset power output so that it will change automatically at the appropriate point in the cycle. The division also uses the Inductron for other selective heating jobs such as annealing and brazing.

There is a "Service Proved" United Roll for Every Mill Installation

UNITED®

44" x 104"
BLOOMING AND SLABBING
MILL



Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

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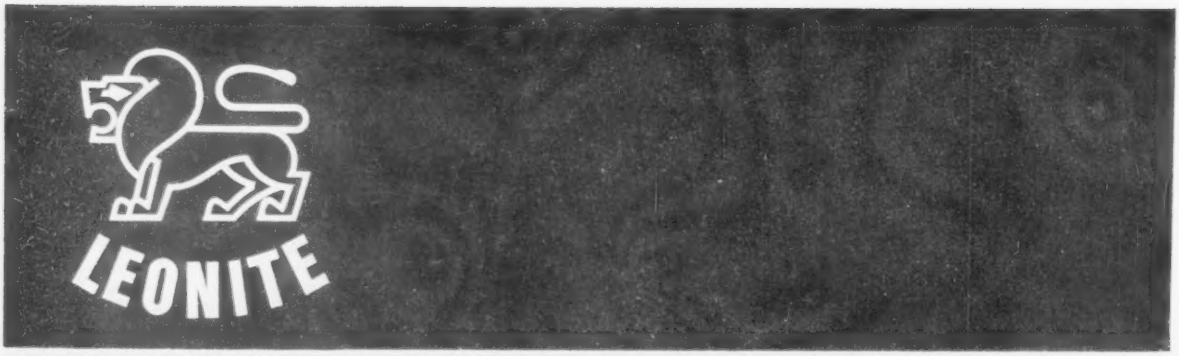

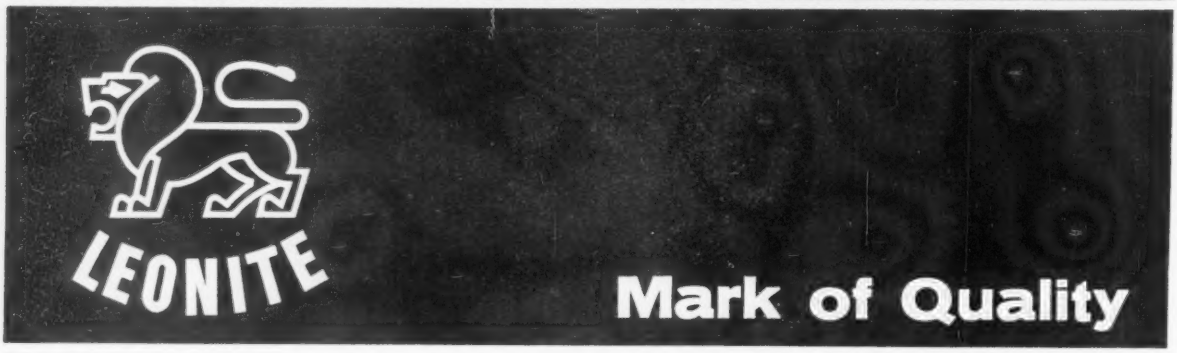

LEONITE is the highest quality NKK galvanized steel sheets, produced by Nippon Kokan's up-to-date Sendzimir-type continuous galvanizing mill, which boasts an extra-long annealing furnace. LEONITE is supplied in all gages and grades specified under various universally accepted standards or according to customers' requirements. Used as stock for roofing, walling, structural members, building material, household appliances and utensils, Leonite finds way into manufactured products of many kinds.

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Cable Address: STEELTUBE TOKYO, KOKANSHIP TOKYO
New York Office: Rm. 1115, 39 Broadway, New York 6, N.Y., U.S.A.
European Office: Kreuz Str., 34 II Duesseldorf, West Germany
Singapore Office: Rm. 414,. Shaw House, Orchard Road, Singapore

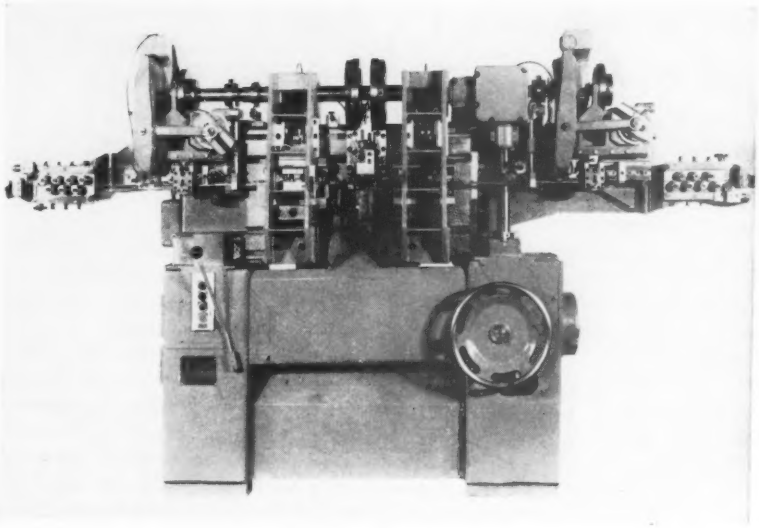
Machine Stamps, Forms 200 Assemblies per Minute

HERE is a vertical metal processing machine that can separately die stamp and form two wire or strip pieces and then assemble them at rates up to 200 assemblies per minute.

The machine, Model V-82, is a redesign of Torrington's original V-82, single feed, four slide. The machine is designed for a 2½ in. maximum strip width, 0.062 in. maximum strip thickness and 0.207 in. maximum wire diameter.

Maximum press capacity is 36 tons (12 tons per press), with two presses on the left side (cutoff removed) and one on the right.

For further information, *write* Machine Div., Torrington Mfg. Co., Torrington, Conn.



Versatility Designed into Trunnion Type Machine

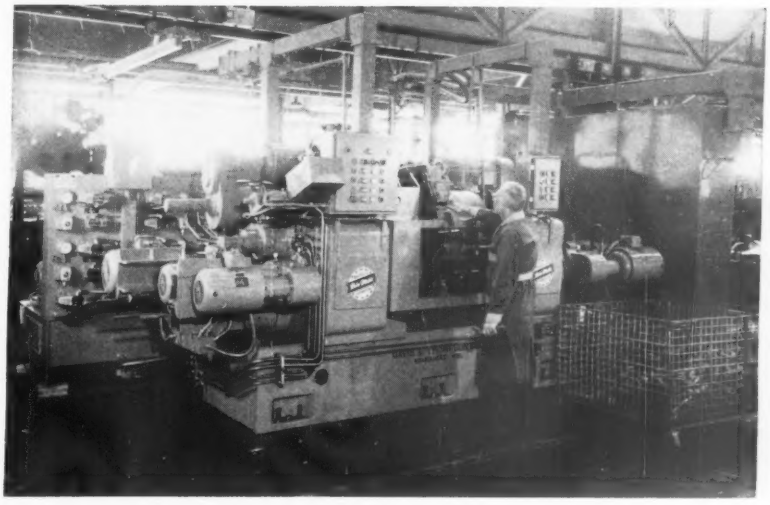
DESIGN of the Model MCI Roto-Matic machine (horizontal trunnion type) gives it versatility, says the maker.

Each station performs its own set of functions and has individual control of feeds and speeds. Hydraulic quill feed head units can be mounted at any station and used for single or multiple spindle operation.

With provisions made for the addition of milling heads, practically any combination of machining operations can be achieved. Fixture mounting drums on the mandrel are designed for tooling requirements. The drums are precision indexed for positive alignment.

Quill head spindles have through holes to enable the use of high pressure coolant directly through the tool for work such as gun drilling or reaming.

Automatic clamping and unclamping are actuated by air or hydraulic power. The machine illustrated has three station index arranged to produce two workpieces per index.



Operations performed: Spot facing, counterboring, and gun reaming ID of trunnion end and core drilling, spot facing, and chamfering the OD and ID of the stem end of universal joint yokes. Production is 240 gross per hour. Due to the requirements of the gun reaming operation, a magnetic sep-

arator and cartridge filtering system is incorporated.

For further information, *write* Davis & Thompson Co., Milwaukee 18, Wis.

Limit Switch Measures Shaft Revolutions

REVOLUTIONS of a rotating driveshaft can be measured by a limit switch developed by General Electric. It's available in nine different gear ratios—from 20 to 1280 to 1. All ratios are provided with the fast resetting action. The unit is available with up to four snap acting switches—each is able to control a separate function or to act simultaneously.

NEMA Type 1, 4, and 7 enclosed forms are available for given environments.

For further information, *write* General Electric Co., Schenectady 5, N. Y.

Electronic Gaging System Designed for Flexibility

AN ELECTRONIC gaging apparatus line is designed to eliminate errors in reading and recording and to permit flexibility. The systems use Winslow electronic gaging probes. The small size of the probes (⅜ x 2 13/32 in.) and their flexible connecting wires allow checkpoints that were previously impossible, says the company. They are particularly valuable for gaging the interior of hollow parts. No visibility is required. (The probes may be completely hidden from the operator.)

The Model CS-24 Console can read out as many as 24 probes either individually when the proper button is touched, or automatically in sequence. Each gage location and the variation from nominal part dimension are shown in large, lighted numbers in readout windows, eliminating operator errors of judgment and parallax. The unit can also print a permanent record on tape, cards, or stickers. The

console also reads the variation in nominal part thickness between any two opposed probes. The unit can be used with any number of different gage designs—moving from one to another with no delay except setup. The gaging equipment is said to be accurate to the nearest 0.0001 in. The average operator under shop conditions has no difficulty of achieving accuracy within 0.0002 in., says the manufacturer.

Other Winslow readout instruments include smaller units which handle anything from 1 to 18 probes and read out on a large meter scale (identifying the location in use with a lighted digital lamp). Some have optional connections to operate automatic sorting devices and other automatic functions.

For further information, *write* Winslow Mfg. Co., 1751 E. 23rd St., Cleveland 14, Ohio.

Bath Deposits Nickel Without Electric Current

A CHEMICAL bath called Enplate Ni-40 deposits a uniformly thick, hard, corrosion resistant, nickel plate without employing an electric current. A nickel phosphorous alloy is deposited on aluminum and other metal substrates, plastics, glass, rubber, and other nonconductors.

The manufacturer says the material provides 100 per cent throwing power on complex parts.

Enplate Ni-410 is supplied as two, purified, liquid concentrates (Ni 410A and Ni-410B) which are added to water to make the bath. The material requires no dummying and produces excellent deposits immediately after makeup, says the company. At an operating temperature of 190° F, the plating rate will initially be 0.375 to 0.400 mil per hour. The bath can be maintained for long periods by replenishment and pH control.

For further information, *write* Enthone Inc., a subsidiary of American Smelting & Refining Co., 442 Elm St., New Haven 8, Conn.

Welder Equipped with Silicon Rectifiers

A WELDER using silicon rectifiers can be set up for arcwelding, cutting, or gouging. A single control dial covers the welding range. Optional remote control (hand or foot operated) can be left connected to the machine and made operational by flipping the remote switch on the control panel.

The silicon rectifiers are permanently sealed. A built-in surge protector prevents damage to the rectifiers. Overload protection is included. Low design and rigid construction permit stacking for parallel operation or conservation of floor space. Two models are offered with 60 per cent duty cycle ratings of 200 and 300 amperes.

For further information, *write* Hobart Bros. Co., Troy, Ohio.

Control Units Developed

SEVERAL control devices have been developed by Leeds & Northrup.

The Speedomax H recorder is designed for precise measurement of a variety of quantities (including force, temperature, voltage, and speed). It was formerly available only in the large, Speedomax G instrument.

The Speedomax H current adjusting type controller is designed to control electrically heated metal processes. The maker says it is small, light, has a fast response speed, a wide control range, and more lineal control for directing signal input and power output.

Other developments include a Speedomax H-2 (action duration adjusting type) for close temperature control of batch heating processes

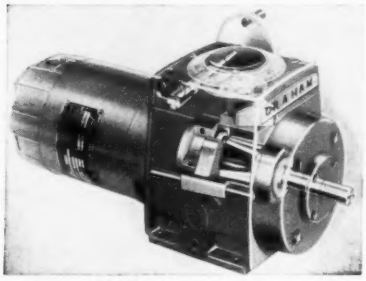
(electric or fuel fired furnaces) and a portable, double range millivolt potentiometer. The potentiometer is made in both single and double ranges for direct temperature reading.

For further information, *write* Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Speed Holding Accuracy On Transmission Featured

A LINE of redesigned, metallic traction transmissions is offered by Graham. Speeds from any desired maximum down to zero and into reverse are available. Accuracy of speed holding and resetting over the entire range is featured. Speeds can be changed with the transmission running or at rest.

Built-in overload protection prevents damage to the driven machine or to the transmission. The one piece housing helps to insure proper alignment and prevents leaks.



A unitized control assembly prevents lost motion or backlash. The company says the gear tooth form produces 10 per cent greater power and quieter operation than previous designs.

Input and output shaft mountings have been redesigned for increased overhung load capacity and better shaft alignment.

A new dial and handle provide micrometer speed adjustment to 1 part in 4000. Faster shifting with less effort is the result of a new method of control ring mounting. Higher and lower operating temperatures are possible with improved lubricants.

Transmissions for 1/6 to 1½ hp are available. Motors, enclosures, spur and wormgear heads, and mechanical, pneumatic, and electric re-

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mote controls are available.

For further information, *write* Graham Transmissions Inc., Menomonee Falls, Wis.

Motor-Generator Supplies Both ac and dc Power

BOTH 120/208 volt, 400 cycle, alternating current and 20 to 30 volt, direct current are supplied simultaneously by the Kato motor-generator set.

Input is provided by a 20 hp, ac motor (550 volts, 3 phases, 60 cycles, 1714 rpm). The ac and dc generators are mounted on the same shaft. The ac generator is a 10 kw, 12.5 kva unit operating at 1714 rpm with a direct connected exciter. The direct current generator is rated at 2 kw, 100 amperes. A static regulator on both generators is capable of a 2 per cent voltage control from no load to full load. Harmonics are under 5 per cent.

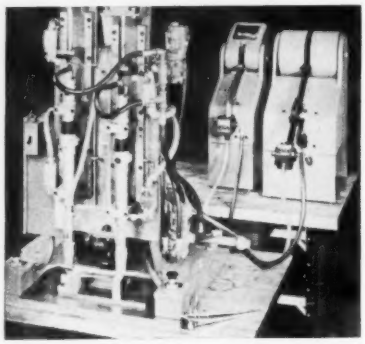
For further information, *write* Kato Engineering Co., Mankato, Minn.

Stud Driving Machine Reduces Assembly Time

AN AUTOMATIC stud driving unit developed by Clyde Engineering & Mfg. automatically feeds, orients, and drives different size self-tapping studs into a casting. In a tryout by one of the major suppliers of automotive parts in Detroit, the method cut assembly time in half.

The feeding units (designated Tru-Tork) can be supplied with up to 12 studs or screws feeding from one hopper. The bench type unit operates on normal plant air supply.

To operate the unit, the part is placed in a nesting fixture. After the operator actuates the palm buttons, the fixture clamps the part into position and starts the machine cycle. The driving heads come down, drive the studs, and return to their original position. When they return, they strike a limit switch which releases the clamping fixture, reloads the driving heads, and shuts off the air motors. Approximate cycle time: 2 seconds.



For further information, *write* Clyde Engineering & Mfg. Co., 937 E. Ten Mile Rd., Madison Heights, Mich.

Attachment Cuts Plate Edge Profiles

A PLATE edge preparation unit, the Linde PE-1, cuts a variety of profiles using standard machine cutting torches with acetylene, natural, or propane gas. The manufacturer says the attachment accurately cuts standard straight edges as well as single, double, or nose bevels. It handles heavy plates that must be prepared with a variety of edge contours.

A free floating feature helps assure smooth, uniform cuts by maintaining the proper nozzle-to-workpiece distance regardless of surface contours or waves.

When changing nozzles or moving the unit, the attachment can be locked above the work. It can also be locked at a 45 to 90 degree angle to simplify nozzle cleaning. Locking movements are cushioned by a safety compression spring.

The attachment can be mounted on a flame planer type bridge, Linde OM-48 side-beam carriage, or the Linde CM-37 portable machine carriage. When mounted on a CM-37, a balance or hook wheel attached beneath the track keeps the unit in proper balance.

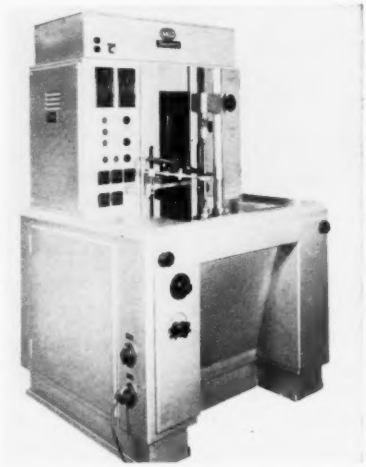
For further information, *write* Linde Co., a division of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

Induction Heating Units Provide High Efficiency

A VERSATILE line of high frequency, induction heating equipment is offered by National Automatic Tool Co. The equipment (oscillator tube and motor generator type) is available through a cross licensing agreement with Delapena & Son Ltd., England.

On oscillator tube equipment, three devices vary the power under all output conditions while still maintaining maximum efficiency. One is an infinitely variable matching transformer arrangement providing fine control over power output. The second is special matching link connections for single or multiturn work coils. The third is a booster condenser which provides additional kva for specific loads.

An outstanding advantage is the air cooled oscillator tube which provides 600 per cent longer life, says National Automatic.



Machines like this induction hardening unit may be designed to handle shafts of almost any length and diameter

An intensifier device is advantageous for hardening gear tooth profiles. Distortion is minimized, tooth loading can be increased over normal through hardening, scaling is eliminated, and noise levels are reduced. Oscillator tube generators are available in sizes from 4 to 200 kw in single or double output voltages.

For further information, *write* National Automatic Tool Co. Inc., Richmond, Ind.

NEW literature

Write directly to the company for a copy

Lathe Conversion

How a standard lathe can be converted quickly into a highly versatile, hydraulic, tracer controlled machine is described in a technical data sheet. Detroit Broach & Machine Co., Rochester, Mich.

Chain Lubrication

General recommendations and suggestions for lubrication of power drive chains as well as conveyor and elevator chains are made in Bulletin 1800. A number of ideas are outlined for lubrication of high temperature chains. Oil-Rite Corp., 2309 Waldo Blvd., Manitowoc, Wis.

Screw Machine Stock

Alcoa Aluminum Screw Machine Stock replaces two earlier machining books from Alcoa (*Alcoa Aluminum in Automatic Screw Machines* and *Screw Machine Stock . . . Estimating and Operating Data*). The four tabbed sections cover general information, properties and tolerances, estimating information, and tooling and operating data. Aluminum Co. of America, 728 Alcoa Bldg., Pittsburgh 19, Pa.

X-Ray Methods

X-ray methods used by a large analytical laboratory in handling many different tasks are described in a folder. It explains analytical procedures for Meehanite, low and high alloy and tool steels, aluminum, brass, bronze, Inconel, Monel, zirconium and titanium alloys, white metals, magnesium, nickel-base, and cobalt-base alloys. Ceramics and petroleum products are also discussed. Philips Electronic Instruments, 750 S. Fulton Ave., Mt. Vernon, N. Y.

Refractory Abrasion Test

The results of an abrasion test for refractory brick and monoliths are detailed in an eight page reprint. Carried on in the Harbison-Walker Garber Research Center, the test uses impingement of a stream of air entrained silicon carbide grit to determine the resistance of specimens. Harbison-Walker Refractories Co., Pittsburgh 22, Pa.

Refractory Applications

Application of refractories in ring type carbon baking furnaces is covered in an eight page reprint. The paper discusses the significance of special design in the intricate flue system, how to select proper refractories to insure stability of flue construction, over-all economy, and importance of refractory maintenance. Harbison-Walker Refractories Co., Pittsburgh 22, Pa.

Miniature Bearings

Sections on nonmenclature and failure analysis are included in a bulletin on miniature bearings. Miniature Precision Bearings Inc., Precision Park, Keene, N. H.

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And what a draw Portland's giant new straight-line bulk unloader furnishes . . . 900 tons-an-hour—the only facility of its kind on the Pacific Coast.

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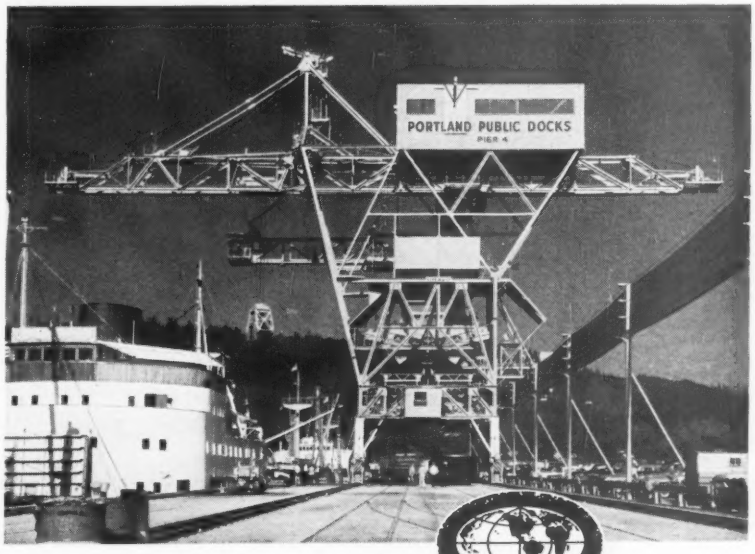

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Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

Output Will Match Consumption

THE STEEL INGOT rate will be a reasonably good market barometer in November and December. It wasn't last month: Production declined for three weeks when steel consumption was rising.

The cutbacks in weekly output that started at the end of September reflected steelmakers' efforts to reduce their in-plant inventories of semifinished and finished material. They had built up their stocks in anticipation of a surge of orders from automakers—a surge that failed to develop because the car companies accumulated steel during the strikes and decided against producing at a breakneck pace when the strikes ended.

Overloaded, the mills had to cut back. Their weekly rate of 2.1 million ingot tons would have produced finished steel shipments of 6.6 million tons in October—about 400,000 tons more than consumers needed. Ironically, they cut back just as automakers were stepping up their output.

NO STOCKPILING YET—Steelmakers had another reason for building their semifinished stocks: They thought nonautomotive customers would start adding to their inventories—either to hedge against the possibility of higher prices or to protect themselves against extended deliveries. To date, such inventory building has been negligible. Users have increased their stocks only as required to support gradually rising production schedules. Their inventories may be higher dollarwise than they were a few weeks ago, but they're unchanged in terms of days of supply.

ORDER TREND SIDEWISE—At present, the market's trend is sidewise. Orders for cold rolled sheets, stainless strip, and electrical steels are picking up, but bookings for tin plate, galvanized steel, and construction products are declining seasonally. Since deliveries are prompt on all but a few items, buyers aren't deviating from their policy of living hand to mouth. Some are so dependent on fast service that, as one steelmaker put it: "The first heavy snowfall may snarl transportation enough to get them into serious trouble."

BUILDUP IN FEBRUARY?—Although users are starting to talk more about the desirability of increasing their inventories, they're not likely to take such action before February. They'll probably add about 4 million tons in the first quarter of next year and 5 million tons in the second quarter. Some won't stockpile as much steel as they did in 1959 because they figure the government won't permit a long strike. Others will feel that heavy stockpiling is prudent. Reason: If settlement costs outstrip anticipated productivity gains, prices will almost certainly go up.

FABRICATORS ENCOURAGED—September bookings for fabricated structural steel (408,000 net tons) were the second highest of any month this year and 40 per cent higher than those of September, 1960, says the American Institute of Steel Construction. Third quarter bookings of more than 1.2 million tons were the best for that period since 1955.

PRODUCTION EDGES UP—Look for ingot production in the week ending Nov. 11 to be slightly higher than the 2,068,000 tons that STEEL estimates the industry poured in the week ended Nov. 4. Output then was 0.5 per cent higher than the previous week's. October's production was about 9.1 million ingot tons, the highest of any month this year. Output in the first ten months of the year: 79.6 million tons (vs. 87.3 million tons in the like period of 1960).

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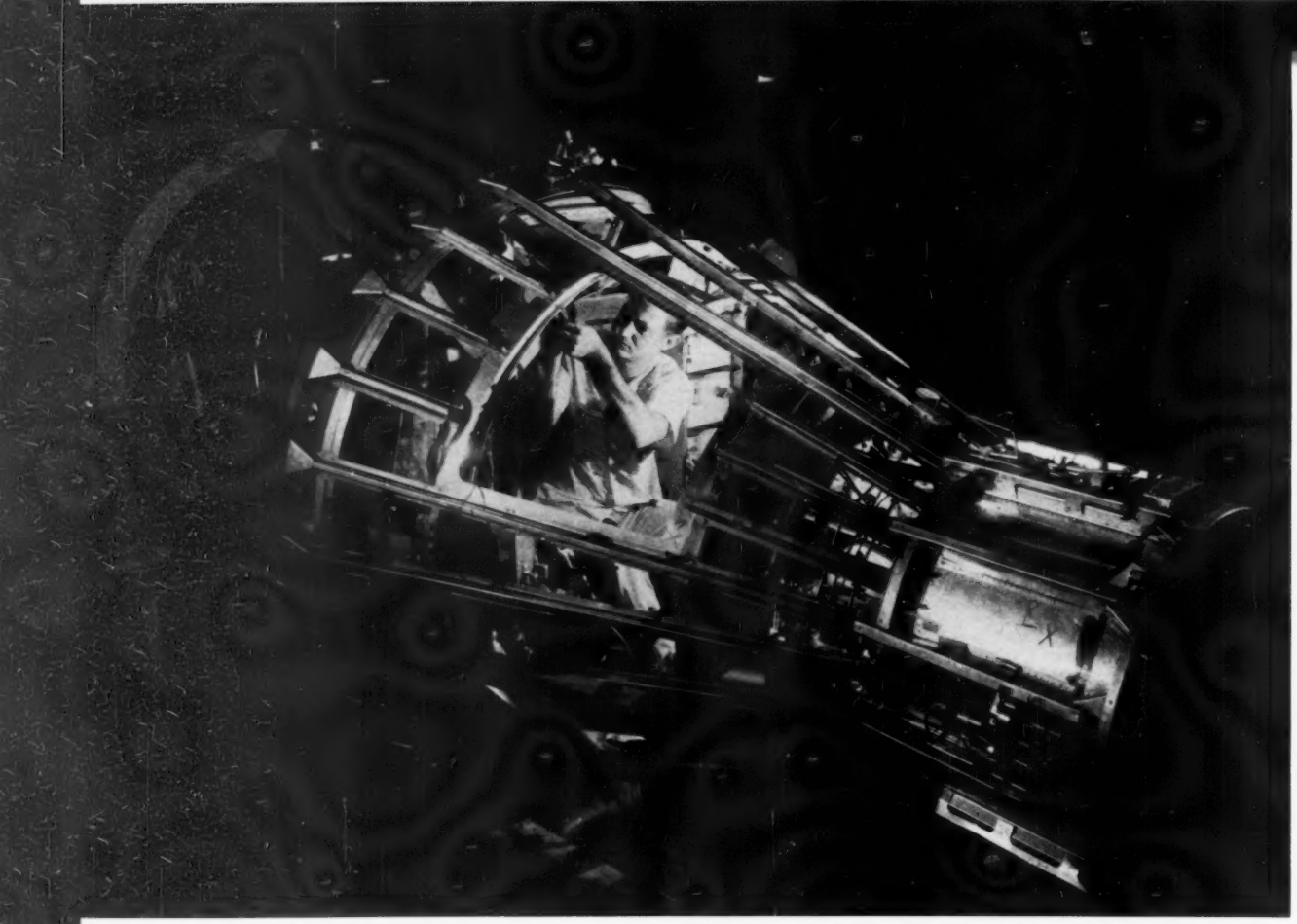
*Current prices were published in the Oct. 30 issue and will appear in subsequent issues.



Framework of the Mercury capsule is titanium

Space uses spur demand as . . .

Titanium Makes Another Comeback

LOOK FOR titanium sales this year to set a record or come within inches of one. The industry, which was almost down and out two years ago, has bounced back in the best success story tradition.

Shipments of mill products jumped from 3200 tons to 5000 tons between 1959 and 1960. This year, the more conservative forecasts peg shipments at 5500 tons, a 10 per cent improvement. The record: 5650 tons in 1957. The more optimistic believe shipments will top 1957's by moving slightly above 5700 tons.

• **Feast or Famine** — Titanium's short commercial history (it started in 1948) has been one of on-again, off-again demand tied directly to defense needs. From 1950 until 1957, the sales line pointed in only one direction: Up. And the first quarter of 1957 was the best on record —2250 tons of mill products were shipped. In the fourth quarter, the pace plummeted to a mere 350 tons.

So despite the current outlook, people in the industry are cautious. Defense programs have been changed too radically, too many times for them to have many illusions.

Titanium's future depends on things that fly. The current showing is mainly due to a pickup in aircraft production, increased output of replacement engines for jets, and a substantial piece of missile-space business.

• **Bulk into Aircraft**—Military aircraft (mainly jet engines) account for about 65 per cent of all titanium consumed. Another 15 per cent goes into civilian aircraft. The growing missile-space vehicle market takes 17 per cent. Of the remaining 3 per cent, about 2 per cent goes to commercial uses (mainly chemical processing equipment) and around 1 per cent to the military ordnance and atomic energy markets.

• **Future Markets**—The metal will probably be used in the skin, structural members, and engine parts of

the supersonic transport, say industry people. If this country produces an advanced design bomber (like the B-70), titanium will probably be one of the main construction materials. In missiles, industry people look for growing markets in pressurization systems and liquid hydrogen tankage. Airborne cryogenic containers are another good possibility.

Space vehicles offer another area for growth. The Mercury space capsules our first two astronauts tested where basically titanium structures. The pressurized capsule is a sandwich of two titanium sheets welded to a truncated conical rib structure made of titanium. The capsule's antenna and the adapter section mating it to the booster are also mainly titanium, says the supplier, Titanium Metals Corp. of America (TMCA).

Titanium is also being mentioned as a possible construction material for submarine hulls, as a result of new welding techniques developed at Battelle Memorial Institute, Columbus, Ohio. Battelle researchers say they have produced crackfree welds in 2 in. titanium alloy plates that have strengths as good as or better than those of the base alloy. A titanium hull would give a submarine the potential to operate deeper, faster, and carry a bigger payload.

The Army's mobile atomic weapon, the Davy Crockett, is fabricated from titanium, but, so far, the tonnage has not amounted to much.

• **Civilian Prospects**—The hope for any early, large scale civilian market rests with the chemical processing industry (heat exchangers, tank linings, mixers). Usage in this area has quadrupled since 1959. But the market is only 150 tons a year, a small percentage of sales.

• **No Export Market**—Domestic producers are pretty much convinced that their markets—both military and civilian—will stay within the boundaries of North America. Japan and Western Europe have enough capacity to discourage exporting in significant amounts.

Producers believe there's enough potential in this country to guarantee a solid future. They cite the metal's physical advantages: Good corrosion resistance in oxidizing environments and salt water; a good strength to weight ratio—it's as strong as steel but 44 per cent lighter—and good service life at −423 to 1000° F.

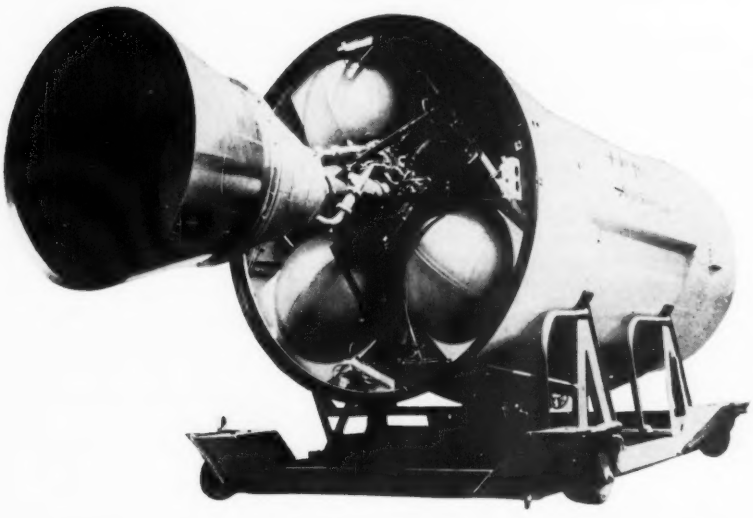
Availability is also good. The four U. S. sponge producers (TMCA, Union Carbide Metals Co., Reactive Metals Inc., and E. I. du Pont de Nemours & Co.) could turn out 23,000 tons a year, and they could rapidly expand it if demand were present. In fact, we have too much capacity (and imports are heavy). Union Carbide, which has the largest capacity, has not been operating its facilities for a year.

The six mill product producers (TMCA, Reactive Metals, Republic Steel Corp., Crucible Steel Co. of America, Harvey Aluminum Inc., and Oregon Metallurgical Corp.) have total annual capacity of about 13,000 tons—far in excess of present needs.

• **Prices Lower**—Prices have been coming down steadily the last few years. In 1954, the TMCA composite price for mill products (based on unalloyed flat rolled and alloyed billet products) was $15.25 a pound. Today, it's $6.13. The industry's goal: Mill products at about twice the price of comparable stainless steel items. The industry still has a long way to go—its composite price is about 4.5 times that of stainless.

Of late, overcapacity has triggered a barrage of price fighting within the industry. Sponge, quoted at $1.37 a pound, is selling for less than $1.35. Mill products are down in varying amounts.

Nevertheless, the industry is convinced that prosperity is on the way.



Titanium is used for the three pressure bottles and nozzle extension of the restartable upper stage of the Able-Star

Plates . . .

Plate Prices, Page 123

Navy specifications for hot carbon and alloy plates are expanding. The business is tending to sustain the the plate market. Merchant shipwork, however, is leveling off, and railroad specifications continue to lag. Also, tank work isn't as good as it was.

Demand for plates for machine tool and heavy industrial equipment appears to be a little more promising.

Subcontracting by naval shipyards, notably Portsmouth, N. H., features demand in New England. Bids close Nov. 10 on two contracts for heavy duty equipment, fabricating, and machining. The work is classified and requires security clearance.

Over-all demand for plates in the New England area is steady with alloy and Hy-80 specifications heavier than usual. The Portsmouth Navy Yard has closed on 1528 tons

of grade Hy-80. Lukens Steel Co. booked the major portion. Weldment and forge shops in the area are slightly more active, but they are placing orders with the plate mills on a nearby shipment basis, covering only firm contracts.

Sheared plates are readily available within three weeks, and, in some cases, they can be had for even quicker shipment. Universal plate shipments range ten days to two weeks.

Steel Bars . . .

Bar Prices, Page 123

The movement of hot rolled carbon bars into consumption is reported to be steady. Over-all order volume is disappointing, but demand is definitely better than it was a few weeks back. The condition applies to hot-rolled alloys and cold-finished bars, as well as the hot rolled carbon grade.

Bar deliveries are showing little change from the two to four week range on carbon grades. Consumers are not inclined to build inventories with relatively prompt shipments available. Bookings in the fourth quarter, however, are expected to top the third quarter's.

Failure of demand to come up to expectations is attributed to the slow buying by the automotive industry. It's now too late for a resurgence of auto demand to help November shipments much.

Suddenly complex finishing has a simple solution!

The Pangborn Vibratory Finishing Machine has an unusually wide range of application. What would you like to descale, deburr, radius, finish or burnish?

Metal and metal alloy as well as many plastic and ceramic parts may be vibratory finished. This machine processes extremely small and delicate items with the same facility it handles large and heavy objects.

What's more, the Pangborn Vibratory Finishing Machine performs as much as 100 times faster than conventional equipment. Cuts costs? You bet!

All sizes of the machine come equipped with variable speeds and amplitudes plus new improved air-cushioned suspension. Optional air-cushioned floor mounts completely eliminate any transmission of vibration to the floor. Auxiliary equipment and the best in media and compounds are available for your every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William E. Brandt at:

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Pangborn
OF HAGERSTOWN

Sheets, Strip . . .

Sheet & Strip Prices, Pages 124 & 127

While there's a little improvement in automotive sheet specifications, over-all demand is little changed. Some sellers anticipate an early rise in forward buying as a hedge against a possible steel strike next year. It's reported that some leading autobuilders are contemplating the purchase of at least seven months' supply of finished steel for the first half of next year.

In general, easy deliveries discourage buying for the immediate future. Promises on hot rolled sheets range two to three weeks and on cold rolled four to five. Galvanized sheets are in easier supply than they've been, with maximum delivery promises extending to mid-November. Deliveries on enameling stock average five to six weeks.

Demand for galvanized sheets is not as strong as it was, and prospects are that galvanizing lines won't be full the rest of this year. It's likely that one Midwest producer will reduce operations from 20 turns to 16 or 18.

It had been expected that demand for galvanized sheets from the automotive industry would come close to offsetting declining requirements from seasonal factors, but it doesn't look as though that'll happen. But cars are using more galvanized sheets, and it's possible auto demand may tighten the market appreciably.

Contracts (totaling $1,139,863) have been placed for 160,000 steel drums with three fabricators by the Quartermaster Depot, Richmond, Va. Rheem Mfg. Co., Linden, N. J., got 57,500 units at $418,425; Southline Metal Products Co., Houston, will furnish 62,500 drums at $438,438, and Evans Cooperage Co. Inc.,

Harvey, La., will furnish 40,000 at $283,000.

Weirton Steel Div., Weirton, W. Va., National Steel Corp., has booked 231 tons of carbon sheets for the Military Industrial Supply Agency, Navy, Philadelphia. Bethlehem Steel Co. booked 174 tons.

Production of Stainless, Heat Resisting Steels Up

Production of stainless and heat resisting steel ingots in the third quarter totaled 299,752 net tons, reports the American Iron & Steel Institute. That was up slightly from the 292,166 tons produced in the second quarter, and it bettered the 232,379 tons produced in the first quarter of the year. In the third quarter, 1960, output was estimated at about 197,177 tons.

Output in the first nine months this year was 824,297 tons, up slightly from the 794,363 tons produced in the like period of 1960.

Tin Plate . . .

Tin Plate Prices, Page 127

Operations at the tin mills are lagging, with demand for tin plate slowing down. One Midwestern producer may shut down its tinning lines this month. The dip in order volume is more than seasonal. Food packs were off this year—tomatoes in particular. The bad weather which caused the crop reduction also held down beverage consumption and, in turn, container consumption.

Distributors . . .

Prices, Page 130

Steel service centers had one of their better business months this year in October. Some say business was comparable with, if not a shade better than, the months of heavy bookings last spring. Indications point to a slight dip in ordering during November and December, chiefly because of fewer working days and yearend influences.

Wire . . .

Wire Prices, Pages 127 & 128

Demand for wire and wire products shows little change. Merchant wire items are available from stock and manufacturers' wire can be had for shipment within three to five weeks in most cases. Delivery promises on wire rods range ten days to two weeks.

Interest in wall mesh wire for concrete block reinforcement is pacing inquiries and orders at a leading wire mill on the West Coast. Over-all wire business in the area is spotty, and imports, particularly rods and mesh, are continuing to provide stiff competition for domestic sellers.

Steel Users in Southwest Planning 1962 Purchases

A spokesman for the Sheffield steel mill at Houston predicts that fourth quarter steel sales will exceed the third quarter's. He reports that a number of customers are beginning to discuss orders for the first half of 1962.

User inventories are low, and it's expected that some rebuilding of stocks will take place before con-

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$17,360 per year
ULTRASONICALLY

An experimental installation for removal of residual smudge from shot blasted strip by means of ultrasonics. A joint project of Pangborn Corp., Wean Engineering Co., Inc., and Branson Instruments, Inc.

The shotblast method of descaling strip is becoming more and more popular, especially among the lower tonnage producers, converters and fabricators. In this process, hot bands are descaled in a blast cabinet with abrasive shot.-Today ultrasonic cleaning is on the way to replacing flash pickling. This method, which eliminates stream pollution and acid disposal, offers many extras:

• LOW INITIAL INVESTMENT (for tanks due to inexpensive steel construction) • LOW MAINTENANCE COSTS • LOW OPERATING COSTS (in terms of heat and power input) • REDUCED OPERATING TEMPERATURES • LITTLE OR NO CORROSION • NO FUME REMOVAL • NO ACID DISPOSAL • SPACE SAVING (ultrasonic installations are shorter in length).

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Ultrasonic Power Division
36 Brown House Road, Stamford, Conn.

tract negotiations in mid-1962. Plate and structural demand is setting the market pace now.

The Sheffield mill's production line for heat treating high strength alloy plates up to 144 in. wide is in full operation after a period of test runs.

It's reported that Sheffield will soon start production of the Scotch nail. The company has exclusive manufacturing rights in 13 states for the serrated, square product. Greater holding power and less wood splitting are advantages claimed.

Tubular Goods . . .

Tubular Goods Prices, Page 129

The number of rotary oil drilling rigs in operation in the U. S. and Canada in the week ending Oct. 23 was 24 higher than it was the preceding week, reports the Hughes Tool Co. The U. S. total was 1816, up 19, the Canadian count 156, up five. A year ago, the count was 1692 rigs active in the U. S. and 150 in Canada.

Republic Steel Corp. has closed its large diameter pipe mill at Gadsden, Ala., because of a lack of orders. About 300 employees have been idled. Other major units of the Gadsden plant continue to operate.

Kaiser Steel Corp.'s sales of large diameter line pipe in the three months ended Sept. 30 were the largest in the company's history, but a decline in demand is expected this quarter because several large pipeline projects have been completed.

Cast iron pipe demand is off seasonally, but a fair volume of business continues to be placed. It's estimated that 1961 order volume will equal that of last year.

Iron Ore . . .

Iron Ore Prices, Page 131

Iron ore mines of Republic Steel Corp. at Mineville, N. Y., are being reactivated after being out of production the last 15 months. Fifty men have been recalled for preparatory work. Some 200 will be recalled when operations resume.

Liberia (Africa) is expected to emerge as one of the world's largest iron ore producing countries within five years, reports the U. S. Commerce Department. It's estimated annual output will total 20 million to 25 million long tons within five years. Major ore finds in the country are being developed by U. S., Swedish, German, and Liberian interests.

Pig Iron . . .

Pig Iron Prices, Page 130

Buying of merchant pig iron edged upward in October, but it is leveling off now. Foundries are using large tonnages of cast scrap in their melts and have not placed the anticipated volume of orders.

Buying continues to be of spot character as supplies remain ample. Considering the fewer working days, shipments probably will be lower in November.

The movement of pig iron out of Buffalo via the Great Lakes and Erie Canal is lighter than usual for this time of year. The situation indicates that consumers are not building big inventories for the winter.

Active blast furnaces in the U. S. and Canada at the start of October numbered 172 (160 in the U. S. and 12 in Canada). The total compares with 146 a year ago (136 in the U. S. and 10 in Canada). Inactive stacks in the U. S. and Canada total 99 (95 in the U. S. and 4 in Canada).

Ingot Output of British Steelmaking Group Drops

United Steel Companies Ltd. (Appleby-Frodingham Steel Co.; Steel, Peech & Tozer; Samuel Fox & Co. Ltd.; Workington Iron & Steel Co.) Sheffield, England, reports ingot production for the group during the financial year ended Sept. 30 was 3,184,326 tons. That was a drop of about 100,000 tons from the previous year's total of 3,284,170 tons.

Production of pig iron decreased about 85,000 tons from the previous record level of 2,008,094 tons to 1,923,314. Coke output was also slightly reduced but was at a record level for a 52 week year.

Structural Shapes . . .

Structural Shape Prices, Page 123

Although demand for fabricated structural steel is easing seasonally the market is still fairly active. Much public work is continuing to be estimated along with a fair diversity of private jobs.

Fabricated steel prices are a trifle firmer, notably in New England. Several of the area's shops that have been practically inactive for months are booking more tonnage, and over-all volume is somewhat better distributed in the district.

The fabricating shops are buying plain structural material only as needed to meet current requirements. Prompt mill deliveries tend to discourage the accumulation of steel inventories.

The structural fabricating industry's backlog of orders as of Sept. 30 totaled 2,729,313 tons, reports the American Institute of Steel Construction. Of that total, 1,457,339 tons (53 per cent) were scheduled for fabrication within the four months ending Jan. 31, 1962.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1300 tons, Washington State, Columbia River, Beebe Bridge, to Pool, McGonigle & Dick, Vancouver, Wash.; Troy T. Burnham Construction Co., Seattle, is general contractor.

1700 tons, three state ferries for Alaska, to Puget Sound Bridge & Dry Dock Co., Seattle.

670 tons, high school, Leominster, Mass., to Groisser & Shlager Iron Works, Somerville, Mass.; Granger Contracting Co., Worcester, Mass., general contractor; also, 54 tons of concrete reinforcing bars, to U. S. Steel Supply Div., U. S. Steel Corp., Boston.

500 tons or more (estimated) Peace Canyon 500 ft bridge, to Western Bridge & Steel Fabricators, Vancouver, B. C.

217 tons, including 79 tons, concrete reinforcing bars, highway bridge, Route 2, Bethel, Maine, to Bancroft & Martin Rolling Mills, South Portland, Maine; H. E. Sargent Inc., Stillwater, Maine, general contractor.

135 tons, state bridge, Washington County, Pennsylvania, to Ft. Pitt Bridge Works, Pittsburgh.

STRUCTURAL STEEL PENDING

2000 tons, tower steel, bids postponed from Oct. 31 to Dec. 15 by Bonneville Power Administration, Portland, Oreg.

583 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia (two contracts); bids Nov. 14.

345 tons, channels, Grade M type A, Military Industrial Supply Agency, Navy, Philadelphia; bids Nov. 14.

238 tons, angles, Military Industrial Supply Agency, Navy, Philadelphia; bids Nov. 13.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, highway bridges and retaining walls, Hayward Park to Exchange St., Providence, R. I., to Plantations Steel Co., Providence; Aetna Bridge Co., Providence, general contractor.

975 tons, also 35 tons of shapes, Washington State, Portage Bay Freeway, Seattle, to Pacific Coast Div., Seattle, Bethlehem Steel Co.; MacRae Bros., Seattle, is general contractor at $2,291,805.

617 tons, state bridgework, Cumberland County, Pennsylvania, through the York County Bridge Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

535 tons, state bridgework, Middlesex County,

New Jersey, to Taylor-Davis Co., Philadelphia.

475 tons, plant addition, Campbell Soup Co., Camden, N. J., to U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh.

200 tons, Washington State, Columbia River, Beebe Bridge, to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

800 tons, Packwood power project, Lewis County, Wash.; bids to Washington Public Power System, Seattle, Nov. 17.

645 tons, four Washington State highway projects, Whatcom, Snohomish, Pierce, and Walla Walla counties; bids to Olympia, Wash., Nov. 14.

100 tons, Washington State bridge, King County; Goodfellow Bros., Wenatchee, Wash., low bidder at $255,271.

100 tons, Washington State overcrossing, Snohomish County; Dale M. Madden Construction Co., Seattle, general award at $179,198.

PLATES . . .

PLATES PLACED

3500 tons, three Alaska State ferries, to Puget Sound Bridge & Dry Dock Co., Seattle.

1725 tons, high tensile, grade Hy-80, Navy Purchasing Office, Washington, to Lukens Steel Co., Coatesville, Pa.

1211 tons, grade Hy-80, Naval Shipyard, Portsmouth, N. H., to Lukens Steel Co., Coatesville, Pa.

325 tons, high tensile, Navy Purchasing Office, Washington, to U. S. Steel Corp., Pittsburgh.

317 tons, grade Hy-80 (two contracts) Naval Shipyard, Portsmouth, N. H., to U. S. Steel Corp., Boston.

145 tons, high tensile, Navy Purchasing Office, Washington, to Bethlehem Steel Co., Bethlehem, Pa.

PLATES PENDING

1400 tons, penstock and surge tank, also 18,000 ft of 72 in. steel or concrete pipe, Packwood power project, Lewis County, Washington; bids to Washington Public Power System, Seattle, Nov. 17.

317 tons, carbon (two contracts) Navy, Military Industrial Supply Agency, Philadelphia; bids Nov. 13.

RAILS, CARS . . .

LOCOMOTIVES PLACED

St. Louis-San Francisco Railway, eight, 2500 hp diesel locomotives, to General Electric Co.; equipment will cost $1,760,000.

Ingot Output Rises Moderately

A SLIGHT improvement in demand for steel prompted producers to raise ingot operations cautiously. Production in the week ended Nov. 4 is estimated by STEEL at 2,068,000 tons, a gain of 0.5 per cent over the previous week's total. Producers are disappointed because October shipments failed to beat September's. They may show a decline.

• **Chicago**—Steelmaking here rose 1 point during the week ended Nov. 4 to a rate of about 73 per cent of 1960 capacity. The rate is set to parallel shipments and is not likely to vary much during the fourth quarter.

• **Los Angeles** — Rebounding demand pushed the ingot operating rate up 3 points during the week ended Nov. 4 to an estimated 80 per cent of 1960 capacity.

• **Cincinnati**—For the week ended Nov. 4, steelmaking operations rose to about 84 per cent of 1960 capacity. One area mill is running close to 100 per cent of capacity.

• **Youngstown** — The steelmaking rate here held unchanged at 61 per cent of 1960 capacity for the week ended Nov. 4. Producers report a slowdown in automotive orders, but they are looking for a substantial upturn in December. Operators are using unusually high ratios of iron in their furnace charges, reducing their consumption of purchased scrap.

• **Buffalo**—Steel production in this district is holding fairly steady near 56 per cent of capacity with 23 open hearths in operation. Bethlehem Steel is using 18 of 36 open hearths; Republic Steel, four of nine; and Wickwire Spencer Steel, one of three.

• **Birmingham** — The steelmaking rate for the Birmingham-Gadsden-Atlanta area of the Southern District was estimated at 72.5 per cent of 1960 capacity in the week ended Nov. 4—a decline of 2.5 points from the previous week's rate.

• **Philadelphia**—Northeastern steel production continued steady during the week ended Nov. 4 with the AISI index close to 111—the prevailing rate of the preceding two weeks.

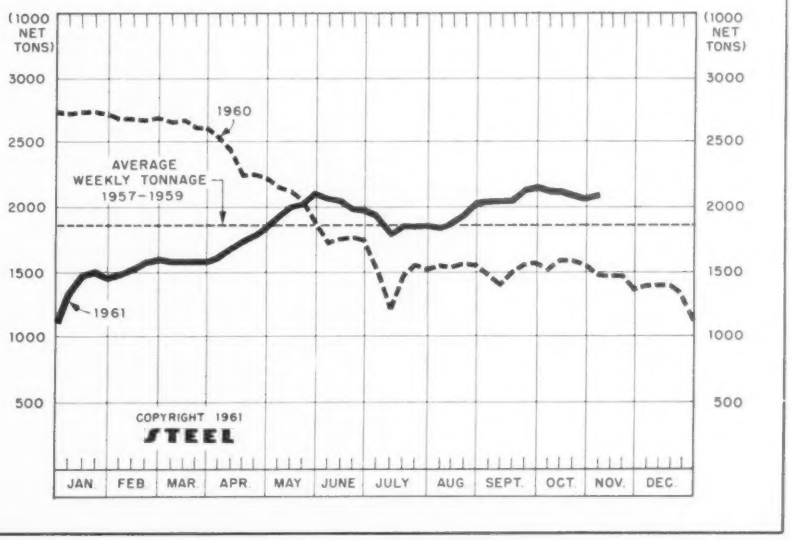
• **Detroit** — Ingot output is at a slower pace than it was a month ago. Local mills say the absence of orders is causing them to schedule slightly less steel production through the balance of this year.

STEEL INGOT PRODUCTION

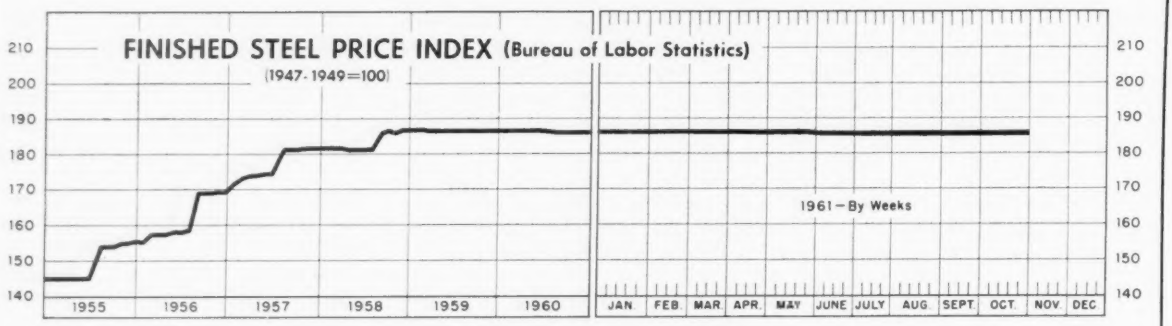
Weeks Ended	Net Tons	Change
Nov. 4	2,068,000*	+ 0.5%
Oct. 28	2,057,000	+ 0.7%
Oct. 21	2,042,000	— 1.4%
Totals to Oct. 28		
1961	78,721,000	— 8.5%
1960	86,026,000	

DISTRICTS	Week Ended Oct. 28 Tons‡	Index†	Week Ended Oct. 21 Index†
Northeastern	296,588	111	111
Buffalo	98,329	101	103
Pittsburgh	423,727	105	105
Youngstown	166,581	98	100
Cleveland	106,484	115	115
Detroit	139,540	133	112
Chicago	411,483	110	108
Cincinnati	95,764	127	128
St. Louis	66,739	127	128
Southern	109,480	101	111
Western	141,465	121	117
Industry	2,057,000	110.4	109.6

*Estimated by STEEL.
†1957-59 (1,862,933 tons) = 100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Oct. 31, 1961	Week Ago	Month Ago	Sept. Index	Year Ago
185.4	185.4	185.4	185.4	186.2

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 31

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	(N.A.)
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.643
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.225
Strip, C.R., Stainless, 430 (lb)	0.460
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe Line (100 ft)	195.423
Casing, Oil Well, Carbon (100 ft)	193.028
Casing, Oil Well, Alloy (100 ft)	302.645
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	192.285
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, 8d Common (50 lb)	4.715
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Nov. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg = 100)	247.82	247.82	247.82	247.82	225.58
Index in cents per lb	6.713	6.713	6.713	6.713	6.111

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$137.48
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	62.63
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	62.18
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	63.41
Steelmaking Scrap, GT	34.67	38.33	39.50	29.17	58.67

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	5.075
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	5.075
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.97	4.93
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.85
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	5.00
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	5.00
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.745	5.00
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.85
Plates, Chicago	5.30	5.30	5.30	5.30	4.85
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	5.25
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.85
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	5.35
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.75
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.75-5.85
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	6.30
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.675
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.675
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.95
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	7.20
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	8.20
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.85

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$91.50
Wire rods, 7/32-9/16" Pitts.	6.40	6.40	6.40	6.40	5.80

PIG IRON, Gross Ton	Nov. 1 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$63.50
Basic, Valley	66.00	66.00	66.00	66.00	62.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.18	66.26
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	63.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.91	66.76
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	59.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	66.70
Malleable, Valley	66.50	66.50	66.50	66.50	63.00
Malleable, Chicago	66.50	66.50	66.50	66.50	63.00
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	235.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$33.50	$37.50	$37.50	$26.50	$57.50
No. 1 Heavy Melt, E. Pa.	39.00	40.00	40.50	34.00	57.50
No. 1 Heavy Melt, Chicago	31.50	37.50	40.50	26.50	61.00
No. 1 Heavy Melt, Valley	36.50	37.50	42.50	26.50	66.50
No. 1 Heavy Melt, Cleve.	32.50	34.50	38.50	23.50	65.00
No. 1 Heavy Melt, Buffalo	31.50	31.50	32.50	25.50	57.50
Rails, Rerolling, Chicago	57.50	58.50	61.50	46.50	87.50
No. 1 Cast, Chicago	39.50	41.50	44.50	36.50	50.50

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$14.50
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	17.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	29.50

Steel Prices

Mill base prices reported to STEEL, Nov. 1, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 124; footnotes, page 128.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOT, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S33 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon Rolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ...90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 ..99.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. C8 .....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 .121.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ...119.00
Lackawanna,N.Y. B2 .119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ...119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14.122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ..5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. P5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ...6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 .6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Buffalo S47 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2...6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ...6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Struthers,O. Y1 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N5 .....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14 .6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Phoenixville,Pa. P4 ....8.10
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ...8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ...5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ...6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ...5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B2 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 ....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1 .7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.60
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R22 ....6.05
Warren,O. R2 .....6.05

FLOOR PLATES
Cleveland J5 .....6.375
Claymont,Del. P4 .....6.375
Conshohocken,Pa. A3 ...6.375
Ind.Harbor,Ind. I-2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ...5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Buffalo S47 .....5.675
Owensboro,Ky.(9) G8..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11.6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5.5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 .....6.725
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Buffalo S47 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
San Francisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy, Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2 7.65
Birmingham C15 .....8.10
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, H5, P17 ...7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit H5, S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025

Hammond,Ind. J5, L2. .9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
N.Tonawanda S47 .....9.025
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

Atlanta A11 .....5.00
Birmingham C15 .....5.25
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fontana,Calif. K1 ....6.375
Ind.Harbor,Ind. Y1 ....5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.475
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. W14 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2. .5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Williamsport,Pa. S19 ..5.75

BARS, Reinforcing, Billet (Fabricated, to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Johnstown,Pa. B2 .....7.33
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
Seattle A24, B3, N14 ...7.95
Williamsport,Pa. S19 ..7.00

SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 16.10
Economy,Pa.(D.R.)B14 20.50
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 20.50
McK.Rks.(S.R.) L5 ...16.10
McK.Rks(D.R.) L5 ...20.50
McK.Rks.(Dir.Rolled) L513.55

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4) (44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 .....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 .....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ....9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.125	....
Ashland,Ky. A10	7.125	7.375
Canton,O. R2	7.125	....
Fairfield,Ala. T2	7.125	7.375
Gary,Ind. U5	7.125	7.375
GraniteCity,Ill.G4	7.225	....
Ind.Harbor I-2	7.125	7.375
Irvin,Pa. U5	7.125	7.375
Kokomo,Ind. C16	7.225	....
MartinsFry. W10	7.125	7.375
Pitts.,Calif. C11	7.875	....
Pittsburgh J5	7.125	....
SparrowsPt. B2	7.225	....
Weirton W6	7.125	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.375

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1)..9.525

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.175
Irvin,Pa. U5 .....7.175

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Canfield,O. C3 .....7.50
Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 .....7.50

SHEETS, Galvanized Steel Hot-Dipped§

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 .....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.H'br'r,Ind. I-2, Y1 6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10. .6.875*
Middletown,O. A10 ....6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous. §For minimum spangled add 0.15c.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Branford Machine & Mfg.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Cairtrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Canfield Steel Co.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire Div., Hoover Ball & Bearing
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating
F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.
H1 Hanna Furnace Corp.
H5 Hercules Drawn Steel
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
J10 Jay Steel Corp.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnest Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N17 National Steel Corp.
N20 Neville Ferro Alloy Co.

O1 Ohio Ferro-Alloys Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P25 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

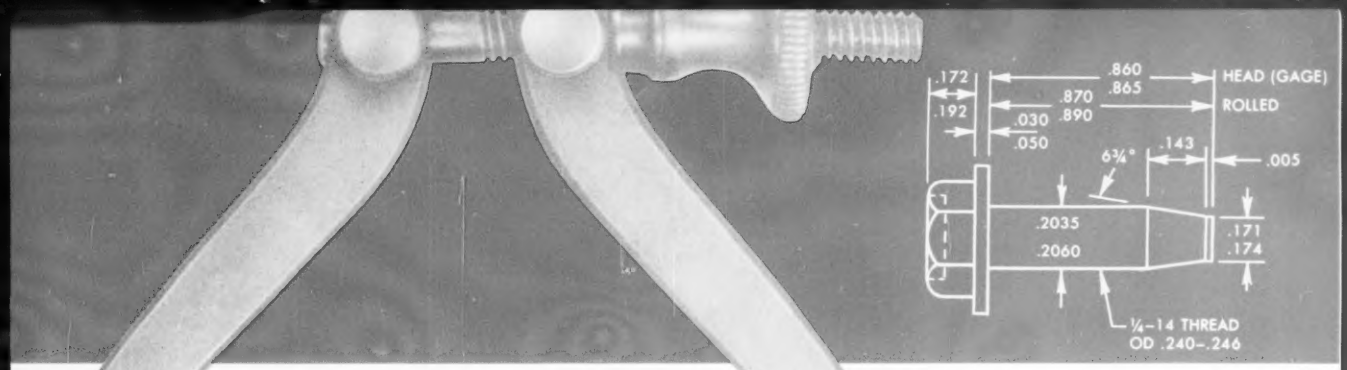
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S31 Sawhill Tubular Products
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada
S47 Seaway Steel Div., Roblin-Seaway Industries
T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Products & Chemical
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Div., National Steel Corp.
W8 Western Cold Drawn Steel Div., Standard Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube



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To upset an indented hex washer head sheet metal screw with a thin washer 300% larger than the original wire diameter calls for good tooling and superior quality wire. Such a screw is cold headed on a 2-blow header by Midland Screw Corporation, Chicago, Ill., from Keystone Special Process Wire.

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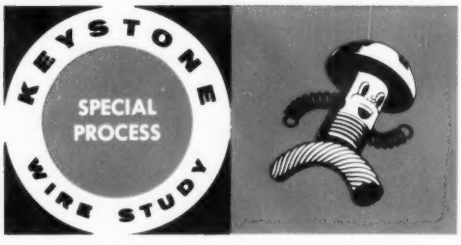
Keystone Steel & Wire Company, Peoria, Illinois



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- Ammonium Bifluoride
- Ammonium Fluoborate
- Barium Fluoride
- Boron Trifluoride (Gas)
- Boron Trifluoride Complexes
- Boron Trifluoride — Curing Agents
- Bromine Pentafluoride
- Bromine Trifluoride
- Cadmium Fluoborate
- Chlorine Trifluoride
- Chromium Fluoride
- Copper Fluoborate
- Fluoboric Acid
- Fluorinating Agents
- Fluotitanic Acid
- Frosting Mixtures

Tank Car—70,000 lbs. (7,000 gals.)

Tank Truck—30,000 lbs. (3,000 gals.)

With a capacity of 30,000 lbs. (3,000 gallons), Harshaw's new Hydrofluoric Acid Tank Trucks fill the volume gap between the drum and the tank car.

Harshaw acquired these tank trucks because they promise certain, measurable benefits to our customers. We would like to discuss these with you.

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- Hydrofluoric Acid Aqueous
- Hydrofluosilicic Acid
- Laboratory Fluorine Cells
- Lead Fluoborate
- Lithium Fluoride
- Nickel Fluoborate
- Potassium Bifluoride
- Potassium Fluoborate
- Potassium Fluoride
- Potassium Titanium Fluoride
- Silico Fluorides
- Silicon Tetrafluoride
- Sodium Fluoborate
- Tin Fluoborate
- Zinc Fluoborate
- Zinc Fluoride
- OTHERS — Inquire

Write for Literature

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ...5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ...8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1.7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3.8.325
SparrowsPoint,Md. B2 .7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.425
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10.7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.425
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10 7.875
NewBritain,Conn. S15 .7.875
NewCastle,Pa. B4, M23.7.425
NewHaven,Conn. D2 ..7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Riverdale,Ill. A1 .....7.425
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ....7.975
Youngstown S41, Y1 ...7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket,R.I. S8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.90
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	18.85	22.95	27.80
Buffalo W12	...	18.85	....	....
Fostoria,O. S1	...	19.05	22.15	....
FranklinPark,Ill. T6	...	19.20	23.30	28.15
Harrison,N.J. C18	...	18.85	22.95	27.80
NewYork W3	...	18.85	22.95	27.80
Palmer,Mass. W12	...	18.85	....	....
Trenton,N.J. R5	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	18.85	22.95	27.80
Youngstown S41	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....4.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ...7.525*
McKeesport,Pa. E10 ..7.50*
NewCastle,Pa. M23 ...7.425*
Riverdale,Ill. A1 .....7.425*
Warren,O. B9, S3, T5.7.425*
Worcester,Mass. A7 ..7.975
Youngstown S41 .....7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Basis Weight 45 lb	50 lb	55 lb	60 lb
Fairfield,Ala. T2	$6.10	$6.25	$6.40	$6.55
Fairless,Pa. U5	6.10	6.25	6.40	6.55
Gary,Ind. U5	6.10	6.25	6.40	6.55
IndianaHarbor,Ind. I-2	6.10	6.25	6.40	6.55
Irwin,Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint,Md. B2	6.10	6.25	6.40	6.55
Weirton,W.Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Electrolytic 0.25 lb (100 lb basis wt) Coating

Aliquippa,Pa. J5 .....$9.10
Fairfield,Ala. T2 .....9.10
Fairless,Pa. U5 .....9.10
Fontana,Calif. K1 .....9.75
Gary,Ind. U5 .....9.10
GraniteCity,Ill. G4 .....9.20
Ind.Harb.,Ind. I-2, Y1 ..9.10
Irvin,Pa. U5 .....9.10
Niles,O. R2 .....9.10
Pittsburg,Calif. C11 ...9.75
SparrowsPt.,Md. B2 ....9.10
Weirton,W.Va. W6 .....9.10
Yorkville,O. W10 .....9.10

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$8.20
Fairfield,Ala. T2 .....8.20
Fairless,Pa. U5 .....8.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.20
GraniteCity,Ill. G4 ....8.30
Ind.Harbor,Ind. I-2, Y1 8.20
Irvin,Pa. U5 .....8.20
Niles,O. R2 .....8.20
Pittsburg,Calif. C11 ....8.85
SparrowsPoint,Md. B2 ..8.20
Weirton,W.Va. W6 ....8.20
Yorkville,O. W10 .....8.20

ELECTRO. TIN-COATED SHEET (20-27 gage; per 100 lb)

IndianaHarb.,Ind. Y1 ..$7.90

(21-27 gage; per 100 lb)

Aliquippa,Pa. J5 .....$7.90
Niles,O. R2 .....7.90

TIN PLATE, HOT DIPPED COMMON COKE

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.40	10.65
Fairless,Pa. U5	10.40	10.65
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

HOLLOWARE ENAMELING

(Black plate) (29 Gage)

Aliquippa,Pa. J5 .....7.85
Gary,Ind. U5 .....7.85
GraniteCity,Ill. G4 ....7.95
Ind.Harbor,Ind. Y1 ....7.85
Irvin,Pa. U5 .....7.85
Yorkville,O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	....	9.975*11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	...	9.875*11.20*	11.90*	13.05*	....
Mansfield,O. E6	.....	9.875*11.70	12.40	13.55	14.65
Newport,Ky. A2	.....	9.875 11.70*	12.40*	13.55*	14.65*
Niles,O. M21	....	....	9.875*11.70	12.40	13.55	....
Vandergrift,Pa. U5	.....	9.875*11.70	12.40	13.55	14.65
Warren,O. R2	.....	9.875*11.70	12.40	13.55	14.65
Zanesville,O. A10	.....	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield,O. E6	8.10
Vandergrift,Pa. U5	8.10
Warren,O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	.....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 .....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ...8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda S47 .....8.00
Palmer,Mass. W12 .....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 ..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00
Buffalo S47 .....8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa.(10) B2 .12.65
KansasCity,Mo. U3 ....12.90
LosAngeles(2) B3 ....13.60
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16 .12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ...13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md.(10)B2 12.75
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.075
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.075
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.20
Milbury,Mass.(12) N6 .10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ...10.20
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ...10.20
SparrowsPt.,Md. B2 ...9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 .....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. M8 16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 .....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ...17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7,J6.16.60

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S41 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 .....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....13.45
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ...13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Pa. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb net box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	9.02
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	9.02
Kokomo,Ind. C16	8.88
LosAngeles B3	9.20
Minnequa,Colo. C10	8.02
Pittsburg,Calif. C11	9.20
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.20
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand. 100 lb coil

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	9.30
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	9.30
Kokomo,Ind. C16	9.16
LosAngeles B3	9.50
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.50
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	9.50
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim 100 lb coil

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	9.35
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	9.35
Kokomo,Ind. C16	9.21
LosAngeles B3	9.55
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.55
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	9.55
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Streling,Ill.(7) N15	198

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	
Cleveland A7	17.85	
Craw'sville M8	17.95	19.80‡‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	17.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	19.10	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
SparrowsPt.	B2.17.95	19.75§
St'ling(37) N15	17.95	19.80
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½Ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality 6 to 8 gage

	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	9.00	9.75*
Bartonville(48) K4	9.10	9.85
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	
CrawfordsvilleM8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55
Houston(48) S5	9.25	9.80**
Jack'vill.Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.SanFran. C10	9.95	10.50**
S.Chicago R2	9.00	9.55**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.10c. **Subject to zinc equalization extras.

FASTENERS

SCREWS, NUTS, BOLTS

(Consumer discounts per cent off list prices, plain finishes. For less than full container quantities, add 25 per cent; attaching nuts to bolts in sizes ¼ in. through ⅝ in. diameter through 8 in. in length, price on application. Discounts are determined by the quantity of screws, nuts, and bolts ordered for one destination at one time.)

Base, one kg	43.00
20,000 lb or more	53.00

SCREWS, SETSCREWS

Hex Screws and High Strength Hex Screws, through 1 in. x 12 in.: Base, one keg	43.00
20,000 lb or more	53.00
Hex Screws 1⅛ in. diameter and larger: See net price schedule.	
Fillister Head Screws, coarse thread:	
Packages	+70.00
Bulk	+28.00
Flat Head Screws, coarse thread:	
Packages	+100.00
Bulk	+52.00
Setscrews, Square Head, Cup-point, coarse thread:	
Packages	+10.00
Bulk	15.00

(Bulk discounts on fillister, flat head, and set screws apply only to products ordered in these minimum quantities: ¼ in. through ⅝ in. diameter, 15,000 pieces; ⅞ in. through ⅝ in. diameter, 5000 pieces; and ⅝ in. through 1 in. diameter, 2000 pieces.)

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburg, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in. larger 12.85 7/16 in. and smaller by 6 in. and shorter, 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over.)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.12
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.725
Steelton,Pa. B2	5.75	5.65	....	....

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

FOOTNOTES

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 3½ in. and smaller hexagons; 9.625c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.25	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 11.50c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling: Ingot	Rerolling: Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	41.50	43.50	39.25	48.50	43.50
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	46.75
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	45.00
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	42.25	52.00	49.50
304L	....	37.25	47.25	48.25	52.00	54.50	50.00	59.75	57.25
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	76.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	84.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	62.25
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 Cb-Ta	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	75.25
403	....	....	26.75	....	29.75	31.50	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	26.75	31.00	29.75	31.50	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	38.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	42.00
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; Branford Machine & Mfg. Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Elwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Phoenix Steel Corp.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels, Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Corp.; Vanadium-Alloy Steel Co., Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5%	Plates: Carbon Base 10%	Plates: Carbon Base 15%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Strip, Carbon Base —Cold Rolled— Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Claymont, Del. P4; Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
NorthTonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	78.11	78.61	79.11	....
Rochester, N.Y., deld.	69.87	70.37	70.87	....
Syracuse, N.Y., deld.	71.22	71.72	72.22	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
SouthChicago, Ill. R2	66.00	66.50	66.50	67.00
SouthChicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland A7, R2	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W.Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
PortColborne, Ont. A25	65.00	65.00	65.50	66.00
SaultSte.Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.60%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%. Foundry grade, 1.75% or under, deduct 50c.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffao H1	$79.25
Jackson, Ohio I-3, J1	78.00
PortColborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.45% max P)

CalvertCity, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Chicago I-3 (Phos. 0.075% max)	71.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Phos. 0.075% max)	71.00
Erie, Pa. I-3 (Phos. 0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb orders. Prices will vary with total weight of the order. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS			STRIP	BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv.	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	STRUCTURAL SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.85	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	9.50	10.26	10.06	11.25	9.65	11.70	16.38	9.85	9.60	11.10
Birmingham	8.46	10.20	10.59	9.45	8.26	13.14	16.65	8.47	8.41	10.05
Boston	9.90	10.40	11.52	12.40	10.05	13.35	16.59	10.50	9.83	11.85
Buffalo	9.30	10.05	11.80	11.70	9.45	11.45	16.30	9.90	9.40	11.80
Charlotte, N. C.	9.95	11.22	10.55	11.35	10.00	12.68	....	10.20	9.95	11.75
Chicago	9.22	10.20	10.13	11.39	9.22	10.65	15.95	9.57	9.06	11.35
Cincinnati	9.38	10.26	10.18	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	9.22	10.66	10.92	11.51	9.33	11.25	16.06	9.96	9.30	11.59
Dallas	9.07	9.88	11.75	10.63	8.48	12.98	16.95	8.71	8.31	9.68
Detroit	9.48	10.46	10.50	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	8.67	9.48	11.35	10.23	8.08	13.10	16.55	8.31	8.00	9.28
Indianapolis	9.66	10.64	10.57	11.83	9.66	11.09	16.39	10.01	8.20	11.79
KansasCity	9.21	10.87	11.35	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	10.35	11.20	12.10	12.40	10.25	14.20	17.35	10.45	10.30	12.30
Memphis, Tenn.	9.63	10.35	10.80	11.29	9.48	12.70	16.53	9.67	9.32	11.18
Milwaukee	9.36	10.34	10.27	11.53	9.36	10.89	16.09	9.79	9.20	11.49
Moline, Ill.	9.57	10.55	10.48	11.74	9.57	11.00	16.30	9.92	9.41	11.70
Newark, N. J.	9.81	10.34	11.35	11.37	10.05	13.25	16.40	10.35	9.04	11.82
New York	9.81	10.78	11.35	11.37	10.05	13.25	16.40	10.35	9.04	11.82
Philadelphia	9.50	10.00	10.66	11.25	9.65	11.95	16.38	9.85	9.60	11.10
Pittsburgh	9.22	10.53	11.68	11.49	9.22	11.25	15.95	9.57	9.06	11.35
Portland, Oreg.	10.40	12.25	12.35	12.40	10.40	16.65	17.85	11.00	10.55	12.70
St. Louis	9.42	10.58	10.51	11.59	9.44	11.28	16.33	9.80	9.28	11.59
St. Paul	8.82	9.49	10.64	10.99	8.82	11.49	16.54	9.17	8.66	10.95
San Francisco	10.65	11.65	11.75	12.70	10.55	15.10	17.25	11.10	10.80	12.95
Seattle	11.35	12.45	13.40	12.80	10.80	16.20	17.85	11.50	10.95	13.60
Spokane, Wash.	11.20	12.30	13.25	12.65	10.65	16.20	17.85	11.35	10.80	13.45

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ¼ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plate, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hitchins, Olive Hill, Ky., Athens, Troup, Tex., Clearfield, Curwensville, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., Frostburg, Md., $133; Templeton, Pa., $135; Salina, Pa., $138; Niles, Ohio, $139; Lehi, Utah, $175.

Super-Duty: Ironton, Ohio, St. Louis, Mexico, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Frostburg, Md., $200; Stevens Pottery, Ga., $210; Troup, Tex., $215; Lehi, Utah, $263.

Sillica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Hawstone, Thompsontown, Pa., Ensley, Ala., Portsmouth, Ohio, St. Louis, $158; Warren, Niles, Windham, Ohio, $163; E. Chicago, Ind., Joliet, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Semisillica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $133; Philadelphia, Clearfield, Pa., $138; Warren, Ohio, $148.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Johnstown, Pa., Vandalia, Mo., $97; Chester, New Cumberland, W. Va., Freeport, Vanport, Merrill Station, Clearfield, Pa., Wellesville, Irondale, New Salisbury, Ohio, $100; Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120; Lehi, Utah, $175.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $250; Danville, Ill., $253; Fords, N. J., Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., Frostburg, Md., $260; Troup, Tex., $265.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $320; Troup, Tex., Fords, N. J., Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., Frostburg, Md., $360; Troup Tex., Fords, N. J., Philadelphia, $365.

Tar Bonded Brick (per ton)

Dolomite: Narlo, Ohio, $87.50. Dolomite-Magnesite: Hays, Pa., Hammond, Ind., $107; Narlo, Ohio, $109.50. Magnesite: Narlo, Ohio, $128; Hays, Pa., Hammond, Ind., $130.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310; Reesdale, Pa., $355.

Runners (per 1000)

Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234; Reesdale, Pa., $245.

Dolomite (per ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines, Chewelah, Wash., $46; minus ⅝ in. grains bulk, Luning, Nev., $46; ⅝ in. grains with fines (periclase), Baltimore, $73, Pascagoula, Miss., $90.

*—9 in. x 4½ x 2.50 straights.

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:
Carbon (N.T.):
Forging $97.00
Rerolling 78.00
Alloy (N.T.) 115.00

Wire Rods:
Carbon 5.70
Alloy 6.40

Wire (carload lots):
Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:
Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Bar Mill Brands:
Carbon 5.40
Alloy 8.05

Bars, Reinforcing 5.30

Structural Shapes:
Standard carbon 5.50
Angles & zees 5.40

Plates, Carbon:
Sheared 5.45
Universal mill 5.10

Sheets & Coils, Hot Rolled:
Carbon sheet 4.95
Carbon strip 5.00

Sheets & Coils, Cold Rolled:
Carbon sheet 6.35
Carbon strip:
(0.080 and lighter) 6.35
(0.081 and heavier) 6.35

Sheets & Coils, Galvanized:
Standard quality ... 6.70
Culvert quality 7.00

Sheets, Porcelain Enameling 7.45

Sheets & Coils, Electrical:
Field grade 9.00
Electrical grade 10.15

Sheet piling 6.15

Skelp 4.70

Rails, Heavy 5.55

Rails, Light 5.70

Joint Bars 6.55

Tie Plates 6.35

Grinding Balls (3 in. diam.) 7.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails....	9.85§
40 mesh bags .....7.50††	
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	27.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe...36.75, ton deld. east of Mississippi.	
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) ...	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 42.80; ton lots	41.80
Brass, 80/20, leaded (60 mesh)	37.80
Bronze powder, 90-10.	56.80
Copper, all types 15.00*	
Lead	7.50*
Manganese, 500 lb and up 25.00*	
Nickel, all types ...0.78-1.06	
Nickel-Silver	56.00
Solder	7.00*
Stainless Steel, 304 ...	89.00
Stainless Steel, 316 ...$1.07	
Steel, AISI 4600	32.00
Tin 14.00*	
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh ..1.57-1.58	
99.5% below 5 microns	2.32
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. (Source of shipment: Western Continental Europe.)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.15	....	$5.10	$5.00	$5.30
Bar Size Angles	5.15	....	5.10	5.00	5.30
Structural Angles	5.05	....	5.00	4.90	5.20
I-Beams	5.05	....	5.00	4.90	5.20
Channels	5.15	....	5.10	5.00	5.30
Plates (basic bessemer)	5.30	....	5.25	5.15	5.45
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	24.16	....	24.09	23.81	25.54
Barbed Wire (†)	6.25	....	6.20	6.10	6.40
Merchant Bars	5.15	....	5.10	5.00	5.30
Hot-Rolled Bands	5.65	....	5.60	5.50	5.80
Wire Rods, Thomas No. 5 (Niederrhein)	5.80*	....	5.75	5.75	6.00
Wire Rods, O.H., No. 5 (Niederrhein)	6.00*	....	5.95	5.95	6.20
Bright Common Wire Nails (§)	7.15	....	7.10	7.00	7.30
(Source of Shipment: Japan)					
Wire, galvanized	$8.62	....	$8.62	$8.62	$8.57
Wire, bright	7.60	....	7.60	7.60	7.55
Wire Rods, O.H. No. 5 (Sumitomo)	5.80	....	5.80	5.75	6.00
Strand, stress relieved (Sumitomo)					
⅜ in. diam, 1000 lineal ft	39.90	....	39.90	39.90	39.50
7/16 in. diam, 1000 lineal ft	53.50	....	53.50	53.50	53.00
Bright common wire nails	7.15	....	7.15	7.15	7.15

†Per 82 lb net reel. §Per 100 lb keg, 20d and heavier. *Except Boston.

Ores

Lake Superior Iron Ore

(Prices effective for the 1961 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi nonbessemer $11.45
Mesabi bessemer 11.60
Old Range nonbessemer 11.70
Old Range bessemer 11.85
Open-hearth lump 12.70
High phos. 11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1961; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports 25.00†
Chilean, 62-65%, c.i.f. Atlantic ports . 22.00
Brazilian (lump), 68.5%, f.o.b. vessel, Victoria, per ton $11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality $14.75-15.00*
Domestic, concentrates, f.o.b. milling points 22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 82.00-85.00c nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1 ..... $34.00-35.00†
48% no ratio ..... 25.00-26.00†

South African Transvaal

44% no ratio 18.75
48% no ratio ..... 24.00-26.00†

Turkish

48% 3:1 ..... 35.00-37.00†

Domestic

Rail nearest seller

18% 3:1 ..... 30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.40

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard
60% min $4.15-4.40
65% min 4.50-4.75

Vanadium Ore

Cents per lb V_2O_5

Domestic 31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace $14.75-15.25
Connellsville, Pa., foundry 18.00-18.50

Oven Foundry

Birmingham, ovens $30.35
Cincinnati, deld. 33.34
Buffalo, ovens 32.00
Chattanooga, Tenn., ovens 30.80
Detroit, ovens 32.00
Pontiac, Mich., deld. 34.05
Saginaw, Mich., deld. 35.63
Erie, Pa., ovens 32.00
Indianapolis, ovens 31.25
Ironton, Ohio, ovens 30.50
Cincinnati, deld. 33.64
Kearny, N. J., ovens 31.25
Milwaukee, ovens 32.00
Neville Island (Pittsburgh), Pa., ovens.. 30.75
New Haven, Conn., ovens 31.00
Painesville, Ohio, ovens 32.00
Cleveland, deld. 34.45
Philadelphia, ovens 31.00
St. Louis, ovens 33.00
St. Paul, ovens 31.25
Chicago, deld. 34.78
Swedeland, Pa., ovens 31.00
Terre Haute, Ind., ovens 31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene 34.00
Xylene, industrial grade 29.00
Creosote 24.00
Naphthalene, 78 deg. 6.00
Toluene, one deg. (deld. east of Rockies) 25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade 14.75

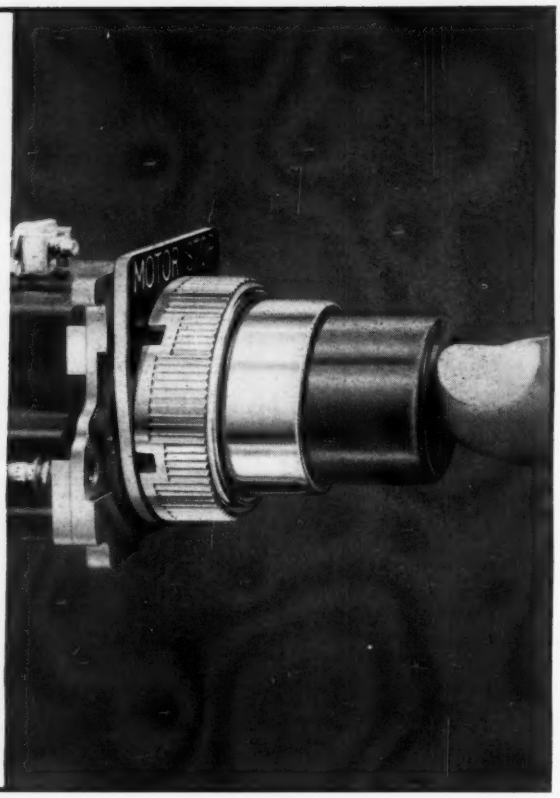
Per ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade $32.00

CONTROL

New! Versatile Cutler-Hammer oiltight pushbuttons let you make any station you want

The new interchangeability built into these operators lets you create the station you want from a complete selection of Cutler-Hammer pushbuttons. Get them in one hole or base mounting, 6 bright colors. Thirty different circuit arrangements can be made in hundreds of varieties of stations in standard arrangements of up to 25 elements. Get up to 8 circuits on one pushbutton. They take 40% less back-panel space than next smallest unit so you get more control in less space. Get facts in PUB. LO-104-W213.



WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S.A.

DIAMOND
Perforated Metals
are Now Produced in a NEW Streamlined Plant to meet . . . LOW INVENTORY Purchasing Requirements

Present-day production managers cut costs by keeping inventories as low as possible and DIAMOND has cooperated . . . by carrying large stocks of materials and delivering finished or partly finished perforated metal parts in lots to meet the purchaser's production schedules.

NOW we have taken another big step to speed deliveries and cut production costs. A New Building. . . additional high-speed equipment and new straight-line operating procedures. . . all combine to assure even quicker service than was possible before.

Write us regarding ANY requirement in perforated metal. Our experienced engineers welcome opportunities to make money-saving suggestions . . . without charge or obligation. Catalog on request.

DIAMOND Manufacturing Co.
Wyoming (Wilkes-Barre Area) Pa.

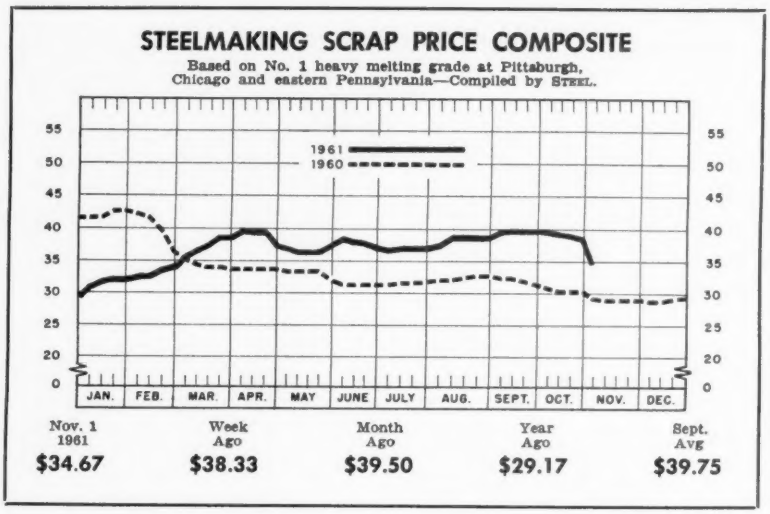
C ELECTRIC FURNACE STEEL CASTINGS
are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

The technical experience and knowledge of our engineering staff are at your service. Write, phone, or call.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE 2, PENNA.



Scrap Nose-Dives, Buying Dries Up

STEEL's composite on No. 1 heavy melting grade falls $3.66 a ton to $34.67, lowest since February. Market still pointed down with demand disappointing

Scrap Prices, Page 134

● **Pittsburgh**—No. 1 factory bundles dropped $5 a ton when brokers bid $37 to $38 (vs. an average of $42.50 last month). Several grades of B&O Railroad scrap were sold at prices below last month's levels. No. 1 heavy melting scrap dropped sharply when a broker for a mill on the fringe of the district offered sellers a price equivalent to $34 a ton, delivered Pittsburgh.

● **Chicago** — Steelmaking scrap prices are off $5-$6 a ton from a week ago. New prices on open hearth grades are predicated on the bids which two district auto stamping plants accepted on about 20,000 tons of No. 1 factory bundles to be produced this month. The successful bids were $10 below those of a month ago.

Coupled with the sagging industrial bundle market, a large district mill has announced $33 as its buying price for No. 1 industrial melting which it accepts this month as returns from customers.

● **Philadelphia**—While domestic demand has been fairly steady, export business has been thinning out, and domestic prices on several grades are off $1 or more a ton. No. 1 heavy melting is holding at $39, delivered, No. 2 heavy melting at $33-$34, No. 1 bundles at $41, No. 2 bundles at $26, No. 1 busheling at $41, and electric furnace bundles at $42. Also, low phos structurals and plates are moving at $42-$43; couplers, springs, and wheels at $44, and rail crops (2 ft and under) at $51-$52.

November purchases of No. 1 cupola have been made at $40, delivered, unchanged. However, heavy breakable cast scrap is easier at $40, as is drop broken machinery at $48-$49. Malleable is nominally unchanged. The market on borings and turnings is largely unchanged, except that machine shop turnings at $14 are nominal.

Weakness in export scrap is ascribed largely to deferment of some shipments to Japan. Certain tonnage scheduled for this quarter will not be moved until next quarter due to congestion at Japanese ports and complications in financing.

● **New York**—Reflecting weakness in the export situation, brokers' buying prices are off $1 a ton on the open hearth grades. Prices on No. 1 heavy melting are $29-$30, No. 2 heavy melting $22-$23, No. 1 bundles $29-$30, and No. 2 bundles $19-$20. Prices on other grades are unchanged.

● **Cleveland** — Except for a small tonnage purchase of No. 1 material by a Valley mill, the market is lifeless, and prices continue to fall. Steelmaking grades are off $2 a ton to $32-$33 for No. 1 steel at Cleveland based on the Valley sale at $37, delivered mill. The market is still pointing downward, with mill buying at a virtual standstill.

● **Detroit**—Prices are down in this market with buying for export drying up. A few brokers are filling existing orders, but tonnages run to less than 1000 tons each.

● **Buffalo**—The market continues under pressure for lower prices, and unless new mill business develops in fair volume for delivery this month, further price reductions are likely. Some traders anticipate a price drop of $1 to $2 a ton on the steelmaking grades before the end of the month.

● **Cincinnati**—Prices on the principal grades of scrap are down $3.50 a ton from a month ago levels. A local mill entered the market for November delivery tonnage, and another area mill has no open market buying program for November. No. 1 heavy melting is quoted $31.50-$32.50, No. 2 heavy melting $25-$26, No. 1 bundles $32.50-$33.50, No 2 bundles $18-$19, No. 1 busheling $31.50-$32.50.

● **St. Louis**—Prices are off $1-$2 a ton on most products; clean auto cast and stove plate are the exceptions. The mills are out of the market, and except for a few transactions in the cast iron grades, not much in the way of new orders is noted. Expectations are prices will sink further before stabilizing. There's an overabundance of scrap here.

● **Birmingham**—Reductions of $1-$2 a ton are reported on various grades of scrap here. Machine shop turnings are off $1, electric furnace bundles $2, No. 1 heavy melting and No. 1 bundles $2 a ton.

The market undertone continues weak, and brokers expect a substantial price drop this month. The feeling is that large scrap buyers

(*Please turn to Page* 140)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Nov. 1, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 1	$34.67
Oct. 25	38.33
Sept. Avg.	39.75
Oct. 1960	30.04
Oct. 1956	57.27

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 dealer bundles	*34.00-35.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*33.00-34.00*
No. 1 factory bundles	*39.00-40.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	*40.00-41.00*
3 ft and under	*37.00-38.00*
Heavy turnings	31.00-32.00
Punchings & plate scrap	*42.00-43.00*
Electric furnace bundles	*40.00-41.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*32.00-33.00*
Stove plate	*32.00-33.00*
Unstripped motor blocks	*23.00-24.00*
Clean auto cast	*33.00-34.00*
Drop broken machinery	*44.00-45.00§*

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
Rails, 2 ft and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Random rails	46.00-47.00
Angles, splice bars	*43.00-44.00*
Railroad specialties	*44.00-45.00*
Rails, rerolling	58.00-59.00

Stainless Steel Scrap

18-8 bundles & solids	190.00-195.00
18-8 turnings	115.00-120.00
430 bundles & solids	90.00-95.00
410 turnings	55.00-60.00

CHICAGO

No. 1 hvy melt., indus.	*32.00-33.00*
No. 1 hvy melt., dealer	*30.00-31.00*
No. 2 hvy melting	*27.00-28.00*
No. 1 factory bundles	*35.00-36.00*
No. 1 dealer bundles	*31.00-32.00*
No. 2 bundles	22.00-23.00
No. 1 busheling, indus.	*32.00-33.00*
No. 1 busheling, dealer	*30.00-31.00*
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*17.00-18.00*
Shovel turnings	*17.00-18.00*
Cast iron borings	*17.00-18.00*
Cut structurals, 3 ft	*38.00-39.00*
Punchings & plate scrap	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Stove plate	*33.00-34.00*
Unstripped motor blocks	*31.00-32.00*
Clean auto cast	*44.00-45.00*
Drop broken machinery	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
R.R. malleable	*44.00-45.00*
Rails, 2 ft and under	*48.00-49.00*
Rails, 18 in. and under	*50.00-51.00*
Angles, splice bars	*42.00-43.00*
Axles	*54.00-55.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel Scrap

18-8 bundles, solids	*175.00-180.00*
18-8 turnings	*100.00-105.00*
430 bundles & solids	*80.00-85.00*
430 turnings	*45.00-50.00*

BUFFALO

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	31.00-32.00
Shovel turnings	17.00-18.00
Machine shop turnings	13.00-14.00
Cast iron borings	15.00-16.00
Low phos. structurals and plates, 2 ft and under	39.00-40.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	42.00-43.00
Rails, 3 ft and under	48.00-49.00
Railroad specialties	41.00-42.00
Rails, rerolling	64.00-65.00

CLEVELAND

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 factory bundles	37.00-38.00
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	15.00-16.00
Shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	*32.00-33.00*
Cut structurals, plate 2 ft and under	*37.00-38.00*
Low phos. punchings & plate	*33.00-34.00*
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	26.00-27.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	27.00-28.00
Brake shoes	37.00-38.00
Clean auto cast	39.00-40.00
Burnt cast	30.00-31.00
Drop broken machinery	45.00-46.00

Railroad Scrap

R.R. malleable	48.00-49.00
Rails, 2 ft and under	*46.00-47.00*
Rails, random lengths	*43.00-44.00*
Rails, 18 in. and under	*48.00-49.00*
Cast steel	37.00-38.00
No. 1 railroad cast	44.00-45.00
Railroad specialties	44.00-45.00
Angles, splice bars	42.00-43.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	85.00-90.00
430 clips, bundles, solids	80.00-85.00
430 turnings	15.00-25.00†

YOUNGSTOWN

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	23.00-24.00†
No. 1 busheling	*36.00-37.00*
No. 1 bundles	*36.00-37.00*
No. 2 bundles	*21.00-22.00*
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	*36.50-37.50*
Electric furnace bundles	*36.50-37.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00-37.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*31.50-32.50*
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	*32.50-33.50*
No. 2 bundles	*18.00-19.00*
No. 1 busheling	*31.50-32.50*
Machine shop turnings	*8.00-9.00*
Mixed borings, turnings	*11.00-12.00*
Shovel turnings	*13.00-14.00*
Cast iron borings	*13.00-14.00*
Low phos., 18 in.	40.00-41.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Heavy breakable cast	*29.00-30.00*
Charging box cast	*33.00-34.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 18 in. and under	*47.00-48.00*
Rails, random lengths	*41.00-42.00*

DETROIT (Brokers' buying prices)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	*32.00-33.00*
Mixed cast	*29.00-30.00*
Stove plate	*27.00-28.00*
Heavy breakable	*26.00-27.00*
Unstripped motor blocks	*21.00-22.00*
Clean auto cast	*38.00-39.00*

Stainless Steel Scrap

18-8 bundles & solids	165.00-170.00
18-8 turnings	75.00-80.00
430 bundles & solids	70.00-75.00

PHILADELPHIA

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*41.00*
No. 2 bundles	*26.00*
No. 1 busheling	*41.00*
Electric furnace bundles	*42.00*
Mixed borings, turings	17.00†
Shovel turnings	20.00
Machine shop turnings	14.00†
Heavy turnings	25.00†
Structurals & plates	*42.00-43.00*
Couplers, springs, wheels	*44.00*
Rail crops, 2 ft & under	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	40.00
Heavy breakable cast	*40.00*
Drop broken machinery	*48.00-49.00*
Malleable	49.00†

NEW YORK (Brokers' buying prices)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*22.00-23.00*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*19.00-20.00*
Machine shop turnings	4.50-5.00†
Mixed borings, turnings	5.00-5.50†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	34.00-35.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	32.00-33.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' prices; f.o.b. shipping point)

No. 1 heavy melting	28.50-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 1 busheling	28.50-29.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	40.00-42.00

ST. LOUIS (Brokers' buying prices)

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*27.00*
No. 1 bundles	*33.00*
No. 2 bundles	*22.00*
No. 1 busheling	*32.00*
Machine shop turnings	*13.50*
Shovel turnings	*15.50*

Cast Iron Grades

No. 1 cupola	*34.00*
Charging box cast	*33.00*
Heavy breakable cast	*31.00*
Unstripped motor blocks	*33.00*
Clean auto cast	37.00
Stove plate	31.00

Railroad Scrap

No. 1 R.R. heavy melt.	*36.00*
Rails, random lengths	*40.00*
Rails, rerolling	*54.00*
Rails, 18 in. and under	*42.00*
Railroad specialties	*39.00*
Angles, splice bars	*38.00*

BIRMINGHAM

No. 1 heavy melting	*36.00-37.00*
No. 2 heavy melting	30.00-31.00
No. 1 bundles	*36.00-37.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	40.00-41.00
Cast iron borings	10.00-11.00
Machine shop turnings	*17.00-18.00*
Shovel turnings	20.00-21.00
Bar crops and plate	44.00-45.00
Structurals & plate	44.00-45.00
Electric furnace bundles	*38.00-39.00*
Electric furnace:	
3 ft and under	*35.00-36.00*
2 ft and under	39.00-40.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	41.00-42.00
Unstripped motor blocks	30.00-31.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, rerolling	51.00-52.00
Rails, 2 ft and under	46.00-47.00
Rails, random lengths	42.00-43.00
Angles, splice bars	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	36.00
No. 2 heavy melting	33.00
No. 1 bundles	38.00-39.00
No. 2 bundles	24.00-25.00
Machine shop turnings	12.50-13.00
Crushed turnings	19.00
Low phos. plate & structurals:	
3 ft	41.00-42.00
2 ft and under	45.00-46.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Heavy breakable	25.00-26.00
Foundry malleable	29.00-30.00
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt (3 ft)	40.00-41.00

LOS ANGELES

No. 1 heavy melting	43.00-45.00
No. 2 heavy melting	40.00
No. 1 bundles	42.00
No. 2 bundles	29.00-30.00
No. 2 bundles (export)	30.00-31.00
Machine shop turnings	20.00
Shovel turnings	20.00
Cast iron borings	17.00-18.00
Electric furnace scrap	50.00-52.00

Cast Iron Grades

No. 1 cupola	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-45.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*41.00*
No. 2 bundles	*26.00*
Shovel turnings	18.00
Electric furnace	*49.00*

Cast Iron Grades

No. 1 cupola	*38.00*
Heavy breakable	*35.00*
Unstripped motor blocks	*33.00*
Stove plate (f.o.b. plant)	*33.00*

SEATTLE (Prepared, f.o.b. car)

No. 1 heavy melting	*46.00*
No. 1 hvy (unprepared)	*41.00*
No. 2 heavy melting	*41.00*
No. 2 hvy (unprepared)	*37.00*
No. 2 bundles	*26.00*
Shovel turnings	*16.00*
Electric furnace	*49.00*

Cast Iron Grades

No. 1 cupola	*38.00*
Heavy breakable cast	*35.00*
Stove plate	*33.00*
Unstripped motor blocks	*33.00*

SAN FRANCISCO

No. 1 heavy melting	40.00**
No. 2 heavy melting	37.00**
No. 1 bundles	30.00**
No. 2 bundles	25.00**
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

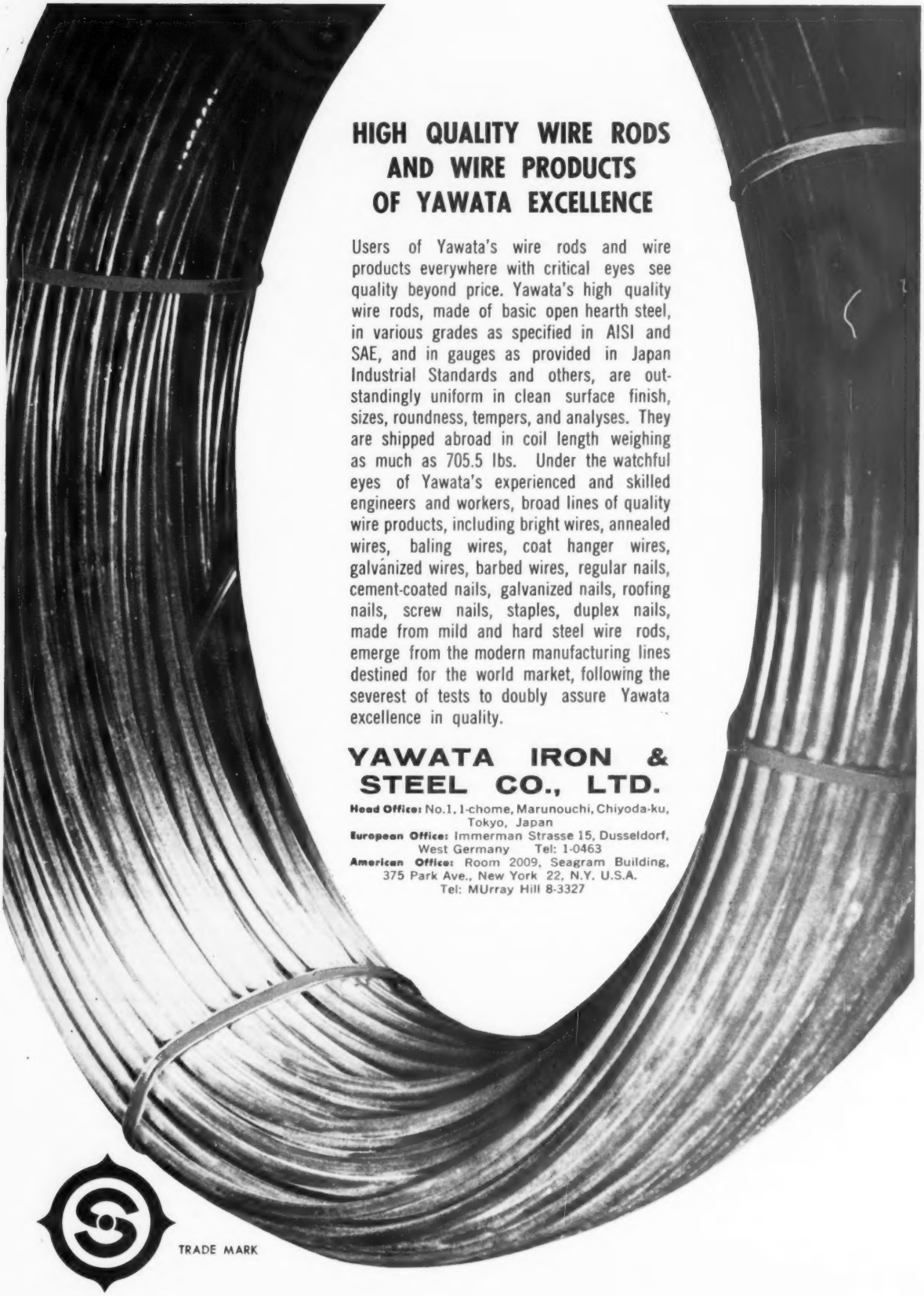
(Brokers' buying prices; net tons)

No. 1 heavy melting	30.00
No. 2 hvy melt, 2 ft & under	29.00
No. 1 bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	30.00
Unprepared	24.00
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	32.00

**Based mainly on export sales.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.



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Users of Yawata's wire rods and wire products everywhere with critical eyes see quality beyond price. Yawata's high quality wire rods, made of basic open hearth steel, in various grades as specified in AISI and SAE, and in gauges as provided in Japan Industrial Standards and others, are outstandingly uniform in clean surface finish, sizes, roundness, tempers, and analyses. They are shipped abroad in coil length weighing as much as 705.5 lbs. Under the watchful eyes of Yawata's experienced and skilled engineers and workers, broad lines of quality wire products, including bright wires, annealed wires, baling wires, coat hanger wires, galvanized wires, barbed wires, regular nails, cement-coated nails, galvanized nails, roofing nails, screw nails, staples, duplex nails, made from mild and hard steel wire rods, emerge from the modern manufacturing lines destined for the world market, following the severest of tests to doubly assure Yawata excellence in quality.

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American Office: Room 2009, Seagram Building, 375 Park Ave., New York 22, N.Y. U.S.A. Tel: MUrray Hill 8-3327

TRADE MARK

Too Much Lead, Zinc on Market

Nonferrous Metal Prices, Pages 138 & 139

LEAD AND ZINC surplusses this year and next may be bigger than the experts had thought.

That's the word being passed by some people who were U. S. delegates to last month's Geneva meeting of the International Lead & Zinc Study Group. Privately, they are critical about the conclave. Sums up one observer: "Delegates couldn't agree on any action, so they did nothing."

One fact became apparent at Geneva. A zinc surplus is rapidly becoming a world-wide problem—a switch from the recent past when virtually all the surplus was in lead.

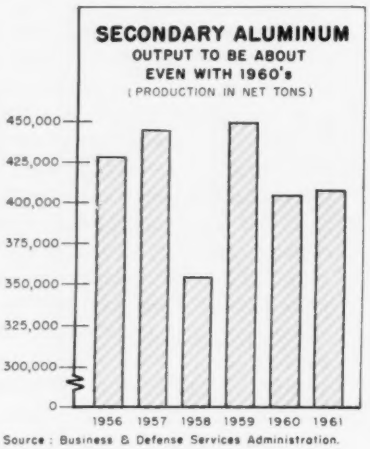
● **How '61 Shapes Up**—Delegates came up with these forecasts: This year, the Free World will mine 2,919,000 tons of zinc (metal content) compared with 2,857,000 tons in 1960. Zinc metal production will be close to 2,834,100 tons vs. 2,702,000 tons last year. Consumption will be 2,881,000 tons compared with 2,744,000 tons in 1960.

In 1962, forecasts the study group, the Free World will see mine output of 3,042,000 tons, metal production of 2,993,000 tons, and consumption of 3,058,000 tons. On the surface, it appears the Free World will consume 65,000 more tons of zinc than it will produce. But the Soviet Bloc plans to export 100,000 tons of metal to the Free World; the British will dispose of 6600 tons from stockpile. Result: An excess of 41,000 tons of zinc for the year.

● **Lead Output Up**—Lead production is still running in excess of consumption despite voluntary production restrictions that have been in effect for some time. This year look for Free World mine production of 1,939,000 tons (vs. 2,018,000 tons in 1960), metal production of 2,592,000 tons (vs. 2,545,000 tons last year), and consumption of 2,544,000 (vs. 2,452,000 tons in 1960).

For 1962: Mine output of 2,108,000 tons, metal production of 2,720,000 tons, consumption of 2,647,000 tons.

Free World lead stocks will go up about 81,000 tons this year, about 105,000 tons in 1962. The Soviet Bloc says it will limit lead exports to the Free World in 1962 to the 1961 level of 60,000 tons.



Source: Business & Defense Services Administration.

● **What's Ahead**—The value of the study group is questioned by some world producers and consumers of lead and zinc. Its biggest contribution probably has been the compilation of statistics on Free World production and consumption and exports from the Soviet Bloc.

The group plans to meet again during 1962's first quarter.

● **On the Home Front**—The U. S. zinc industry is having a good year despite disappointing sales to diecasters and some price weakness in the diecasting grades. Demand from galvanizers has been hefty all year, and should push 1961 shipments over 900,000 tons, a four year high. The prime western price looks stable.

Lead is another story. Sales have been sick recently. This year may wind up better than last, but current business is extremely disappointing to the industry. One probable reason for the slump is that many customers have been holding back purchases, waiting for the price cut that finally came last week.

The drop of 0.5 cent a pound to 10.5 cents on Nov. 1 came as no surprise. The European price is under 8 cents a pound. While it's true the U. S. is somewhat insulated from Europe because of import restrictions, the domestic market does not operate in a vacuum. As STEEL went to press, it was a tossup whether the new price would stick

(*Please turn to Page* 139)

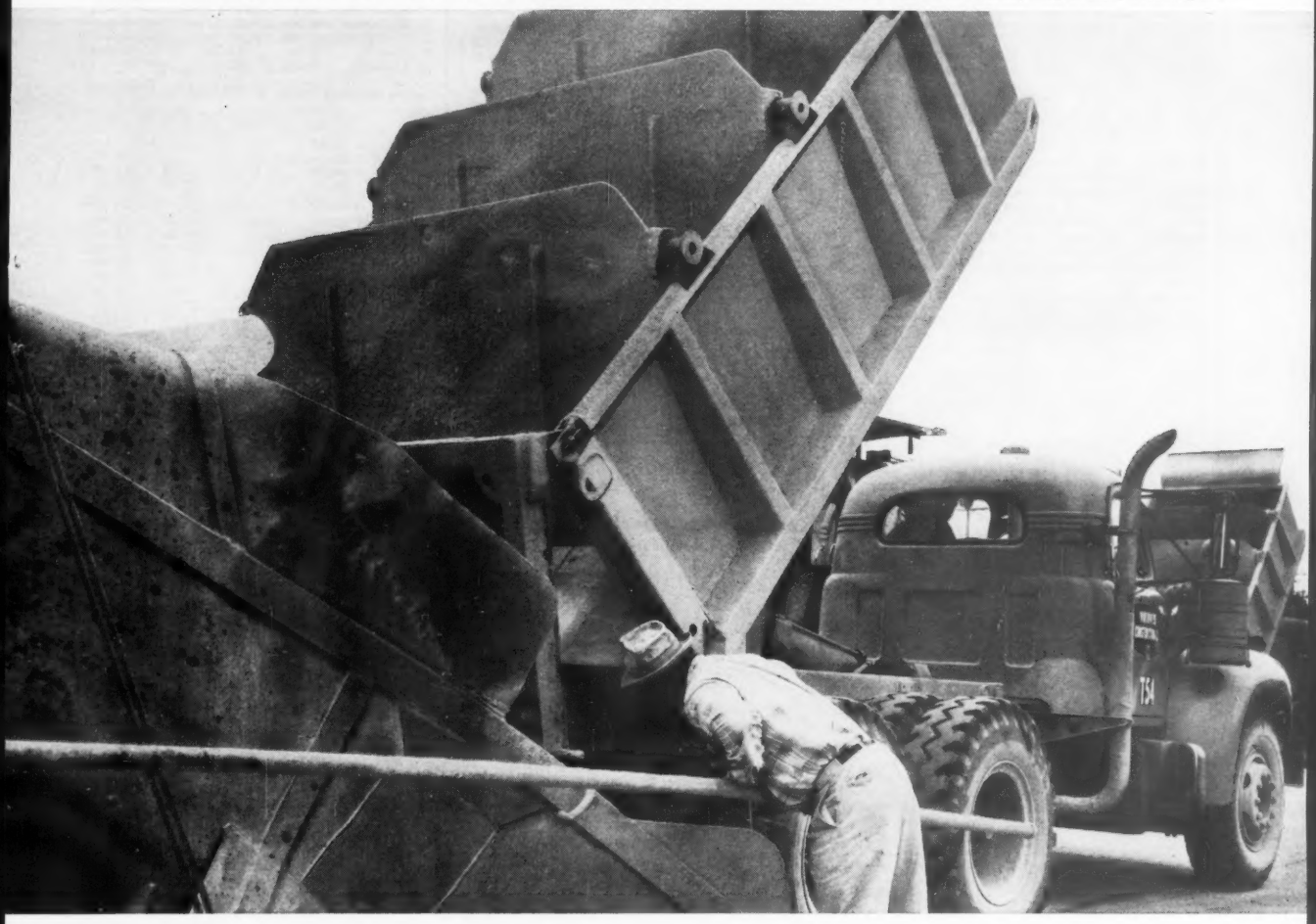
NONFERROUS PRICE RECORD

	Nov. 1 Price	Last Change	Previous Price	Oct. Avg	Sept. Avg	Nov., 1960 Avg
Aluminum	24.00	Sept. 25, 1961	26.00	25.520	26.000	26.000
Copper	31.00	May 19, 1961	30.50	31.000	31.000	30.000
Lead	10.30	Nov. 1, 1961	10.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	81.25	June 30, 1961	74.00	81.250	81.250	74.000
Tin	123.25	Nov. 1, 1961	122.625	121.099	121.960	103.359
Zinc	11.50	Jan. 9, 1961	12.00	11.500	11.500	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Now **you can get USS "T-1" Steels from Steel Service Centers coast to coast**

All the dry mix leaves the box because of the smooth, dent-free surface of USS "T-1" Steel bottom plates. Extra clean-out men are not needed. Understructure, sides, batch and tail gates are USS COR-TEN Steel for strength and light weight. Truck Body Fabricator: Capital Industries, Inc., Seattle, Washington.



The best combination for performance . . .

Dump truck bodies made of USS "T-1" and COR-TEN Steels

"Pouring 4,100 feet of concrete highway is a good day's work," says Louis Tomaso, pouring superintendent for Northwest Construction Company, Seattle, Washington. "This kind of production takes the best equipment. That's why we are sold on dump boxes made with U. S. Steel's 'T-1' and COR-TEN Steels."

"With 'T-1' Steel in the bottoms and COR-TEN Steel in the sides and gates, we get a clean dump every time," says Mr. Tomaso. "The surface remains smooth and dent-free. None of the mix hangs up in the truck."

Northwest's trucks also double as earth movers and here's where they meet their real test. The maintenance superintendent, Homer Baer, says, "USS 'T-1' Steel is tough enough to take the impact of heavy rocks falling from the shovel and the $\frac{3}{16}$-inch bottom plates have never ruptured, stretched or dented."

Less weight—more payload. The combination of USS "T-1" Constructional Alloy Steel and COR-TEN High Strength Steel cuts 1,020 pounds of dead weight from the trucks and allows bigger payloads. USS "T-1" Steel and the new lower priced "T-1" type A Steel can be furnished to a minimum yield strength of 100,000 psi, or a minimum hardness of 321 Brinell, depending on application. USS "T-1" Steel can also be furnished to 360 Brinell. All of these tough, weldable steels can reduce weight and increase the strength and life of your equipment. Call your local Steel Service Center for more information. Or, for the name of the distributor of USS "T-1" Steels nearest you, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Export Company

USS **United States Steel**

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 30 and 50 lb ingots, 24.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.20; No. 43, 25.30; No. 195, 26.70; No. 214, 28.10; No. 356, 26.00, 30 and 50 lb ingots.

Antimony: R.M.M. brand, 95.5%, 32.50; Lone Star brand, 33.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 30.50-31.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $40 per lb and up nom.

Copper: Electrolytic, 31.00 deld; custom smelters, 31.00 nom; lake, 31.00 deld; fire refined, 30.75.

Germanium: Purified, ingots, less than 1 kg 37.50 per gram; 1-10 kg 32.00 per gram; 10 kg or more, 29.95 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.30; chemical, 10.40; corroding, 10.40; St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld; 24-99 lb, $9.50; 100-449 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $188-191 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 81.25; 10-lb pig, unpacked, 89.00; "XX" nickel shot, 88.75; "F" nickel shot for addition to cast iron, in kegs, 81.75; "F" nickel, 5 lb ingots, 82.75. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.09. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 77.50.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $5.25 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 123.25; prompt, 123.125.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max), $1.37 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.25.

Zinc: Prime Western, 11.50; brass special 11.70; intermediate, 11.70, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 12.35; special high grade, 12.50 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.25; No. 5, 14.00 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7.25-7.75 per lb; 100-500 lb, $6.75-7.25 per lb; 500-1000 lb, $6.25-6.75; over 1000 lb, $6.25 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00; No. 12 foundry alloy (No. 2 grade), 21.25; 5% silicon alloy, 0.60 Cu max, 23.00; 13 alloy, 0.60 Cu max, 23.00; 195 alloy, 24.25; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.50.

Brass Ingot: Red brass, No. 115, 32.00; tin bronze, No. 225, 41.25; No. 245, 35.75; high leaded tin bronze, No. 305, 36.00; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.98, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.98, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.35; l.c.l., 36.98. Weatherproof 20,000-lb lots, 37.05; l.c.l., 37.80.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.00 per cwt; pipe, full coils, $16.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $5.70-15.50; sheared mill plate, $4.45-9.00; wire, $5.00-9.50; forging billets, $3.00-4.75; hot-rolled and forged bars, $3.39-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $11.00-16.00; H.R. strip, $11.00-15.00; C.R. strip, $13.00-18.00; forged or H.R. bars, $11.00-15.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	147	126	145
Strip, C.R.	133	114	145
Plate, H.R.	134	116	133
Rod, Shapes, H.R.	116	95	116
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish,

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.183	24-72	72-180	44.40-47.00
0.183-0.154	24-72	72-180	44.40-47.00
0.154-0.120	24-72	72-180	44.90-47.80
0.120-0.096	24-72	72-180	44.90-47.80
0.096-0.076	24-72	72-180	45.40-49.30
0.076-0.060	24-72	72-180	45.90-50.10
0.060-0.047	24-72	72-180	46.40-51.30
0.047-0.037	24-72	72-180	46.90-52.70
0.037-0.030	24-72	72-180	47.40-54.30
0.030-0.023	24-60	72-180	47.90-56.10
0.023-0.018	24-48	72-144	48.40-56.40
0.018-0.014	24-48	72-144	50.20-57.00
0.014-0.011	24-48	72-144	52.50-59.00
0.011-0.0085	24-36	72-96	55.20
0.0085-0.007	24-36	72-96	58.20
0.007-0.006	24-36	72-96	61.00

ALUMINUM (continued)

Plates: 1100, 3003, and 5005, mill finish, O, H12, and H14 tempers, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
3.000-2.000	6-144	72-240	45.10-50.00
2.000-1.251	6-144	72-240	45.50-50.30
1.251-0.751	6-144	72-240	44.50-49.60
0.751-0.250	6-144	72-240	44.50-49.60

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	74.90	76.30	....	....
0.188	63.20	62.20	....	79.10
0.250	60.00	61.60	72.70	73.10
0.375	59.20	62.80	71.00	71.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	62.80	71.00	71.00
0.625	59.20	62.80	67.80	66.90
0.750	57.70	61.00	61.60	62.80
0.875	57.70	61.00	61.60	62.80
1.000	57.70	61.00	61.60	62.80
1.125	55.30	58.50	59.50	60.50
1.375	55.30	58.50	59.50	60.50
1.500	55.30	58.50	59.50	60.50
1.625	53.00	55.70	....	58.30
1.750	53.00	55.70	58.30	58.30
1.875	53.00	55.70	....	58.30
2.000	53.00	55.70	58.30	58.30
2.250	51.50	54.00	....	58.30
2.500	51.50	54.00	....	58.30
2.750	49.90	52.20	....	58.30
3.000	49.00	52.20	....	58.30
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Rounds, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 45.50-55.60; 6061, 41.50-55.60; 7075, 55.50-64.60; 7079, 58.50-66.60.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.00
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. width: .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	(AZ31C) Com. Grade	(AZ31B) Spec. Grades
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-106.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.75-24.25; No. 2 heavy copper and wire, 21.75-22.25; light copper, 19.00-19.50; No. 1 composition red brass, 21.50-22.00; No. 1

BRASS MILL PRICES

(Copper or Copper Alloy No.)	MILL PRODUCTS a Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES d (Based on copper at 31.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper (110)	56.13b	50.36-51.36	....	57.32	27.00	27.00	26.25
Yellow Brass (268, 270)	49.27	35.77c	49.56	53.43	20.375	19.50c	18.50c
Low Brass, 80% (240)	52.15	52.09	52.44	56.21	22.875	22.625	22.125
Red Brass, 85% (230)	53.17	53.11	53.46	57.23	23.875	23.625	23.125
Com. Bronze, 90% (220)	54.73	54.67	55.02	58.54	24.75	24.50	24.00
Manganese Bronze (675)	57.69	51.27	61.54	....	19.25	19.00	18.50
Muntz Metal (365)	51.94	47.25	....	....	19.125	18.875	18.375
Naval Brass (464)	53.94	47.75	60.25	58.10	19.00	18.75	18.25
Silicon Bronze (651)	61.39	60.58	60.68	79.80	26.50	26.25	25.75
Nickel Silver, 10% (745)	65.56	67.16	66.91	....	26.00	25.75	13.00
Phos. Bronze, A-5% (510)	76.97	77.47	76.72	78.90	28.50	28.25	27.25

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Free cutting. d. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 20.50-21.00; new brass clippings, 16.25-16.75; light brass, 13.25-13.75; heavy yellow brass, 14.25-14.75; new brass rod ends, 14.25-14.75; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 17.50-18.00; brass pipe, 16.50-17.00.

Lead: Soft scrap lead, 7.25-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.50-8.75; electrotype, 8.00-8.25; mixed babbitt, 10.00-10.50.

Monel: Clippings, 26.00-26.50; old sheets, 25.00-25.50; turnings, 18.50-19.00; rods, 25.00-25.50.

Nickel: Sheets and clips, 56.00-58.00; rolled anodes, 56.00-58.00; turnings, 43.00; rod ends, 56.00-58.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.50; old diecast scrap, 1.75-2.00.

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 3.00-3.50; segregated high copper clips, 9.25-9.75; mixed low copper clips, 9.75-10.25; mixed high copper clips, 9.25-9.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 8.50-9.00; clean borings and turnings, 7.00-7.50; segregated low copper clips, 14.00-14.50; segregated high copper clips, 12.50-13.50; mixed low copper clips, 12.00-13.00; mixed high copper clips, 11.00-12.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 9.75; clean borings and turnings, 8.50; segregated low copper clips, 13.00; segregated high copper clips, 12.25; mixed low copper clips, 12.50; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not les than 1.5% Be, 57.00; light scrap, 52.00; turnings and borings, 37.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) dry copper content, 23.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 24.00; No. 1 composition solids, 24.50; heavy yellow brass solids, 18.00; yellow brass turnings, 16.50; radiators, 20.00.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.50; oval, 44.50; electrodeposited, 37.50; cast, 42.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 500 lb, 117.50; 500-1999 lb, 110.50; 2000-4999 lb, 107.00; 5000-29,999 lb, 106.00; 30,000 lb, 105.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 141.50; 200-499 lb, 140.00; 500-999 lb, 139.50; 1000 lb or more, 139.00.

Zinc: Balls, 18.25; flat tops, 18.25; flats, 21.00; ovals, 20.85, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chrome Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.50; 2000-5900 lb, 13.50; 6000-11,900 lb, 13.25; 12,000-22,900 lb, 13.00; 23,000 lb or more, 12.50.

Nickel-Chloride: 100 lb, 47.50; 200 lb, 45.50; 300 lb, 44.50; 400-4900 lb, 42.50; 500-9900 lb, 40.50; 10,000 lb or more, 39.50.

Nickel Sulphate: 5000-22,999 lb, 31.00; 23,000-39,900 lb, 30.50; 40,000 lb or more, 30.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 89.60; 100-600 lb, 79.90; 700-1900 lb, 77.20; 2000-9990 lb, 75.30; 10,000 lb or more, 74.00.

Stannous Chloride (Anhydrous): 100 lb, 149.00; 400 lb, 139.00; 800-19,000 lb, 117.70; 20,000 lb or more, 113.50.

Stannous Sulphate: Less than 50 lb, 156.30; 50 lb, 126.30; 100-1900 lb, 124.30; 2000 lb or more, 122.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

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or whether it would slide another half cent.

Better Year for Aluminum

Aluminum sales will show a significant gain this year, believe members polled by the National Association of Aluminum Distributors.

Aluminum is abundant. The Business & Defense Services Administration makes this estimate of 1961 domestic supply: Primary production, 1,905,000 tons; primary imports, 186,500 tons; secondary recovery, 408,000 tons (see chart); recovery from imported scrap, 5500 tons. Total: 2,505,000 tons vs. 2,580,000 tons in 1960.

CLASSIFIED ADVERTISING

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Due to planned expansion, openings now exist at several levels in our Process Engineering Department. This department's responsibility is the solving of manufacturing problems in our multi-plant operation. We are one of the leaders in the Automotive parts and Equipment field on A 100% COMMERCIAL PROGRAM.

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COMPETENT WITH AT LEAST FIVE YEARS EXPERIENCE IN STEEL, STAINLESS STEEL, ALUMINUM PLATE FABRICATION; MUST KNOW THE ASME CODE, PRESSURE VESSELS, AND ALL MODERN WELDING TECHNIQUES; MUST HAVE ABILITY TO LEAD 100 MEN; EXCELLENT OPPORTUNITY WITH GROWING COMPANY IN NEW FIVE ACRE PLANT. SUBMIT DETAILS OF EXPERIENCE AND SALARY REQUIREMENTS TO: MR. O. H. GARDNER, COLE ENGINEERING INC., 24747 CLAWITER ROAD, HAYWARD, CALIFORNIA.

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Shear: 600 ton 3" x 30" Continental
Rolling Mill: Farrel (size 26" x 36")—2 high
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Induction Melting Furnace: Ajax (12 units)

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We agree that most of the bombastic claims and counter-claims about brand superiority in metal cutting products are just so many words. All of the several top brands – *including* Victor – are extremely close in price and quality, and more and more buyers are recognizing this fact. There are *some* differences of course, but they hardly rate claims like, "best buy," "longer lasting," or "cleanest cutting in the field."

For our part, we do not attempt to out-yell our competitors... and the low noise level is not the only benefit accruing to you from this policy. More importantly, you can be absolutely certain that every Victor product you purchase from your local Victor distributor will do *exactly* what he and we say it will do.

Fair price, prompt delivery, and product backing do not have to be talked up either... they're facts of life with Victor, and our distributors.

3032

VICTOR

VICTOR SAW WORKS, INC.
Middletown, N. Y.

(*Concluded from Page* 133)

are forcing prices down so they can meet the wage hike given labor Oct. 1.

• **Houston**—Brokers are predicting that scrap purchases the rest of this year will be at lower prices. Export demand is weak, and both major Texas steel mills hold heavy inventories. Mexican buyers are expected to offer lower prices when they return to the market this month. Demand for cast scrap is spotty, and prices are soft.

• **Los Angeles** — Settlement of the strike which has caused a near shutdown of the scrap industry here for three weeks is expected to be settled shortly. Demand for scrap continues slow, and some dealers are predicting a sharp drop in prices this month. Inventories are fairly heavy.

• **Seattle**—Prices dropped $3-$4 a ton last week. No. 1 heavy melting is quoted $46 both here and at Portland, with No. 2 heavy melting $41, No. 2 bundles $26, electric furnace material $49, and No. 1 cupola $38.

Exporters decline to bid until the market is completely adjusted. The drop in prices is attributed to two factors: Lack of domestic buying and weakness in the export market.

• **San Francisco**—Prices on steelmaking grades of scrap are holding at the recently established levels, but they are weak. Further reductions of $1-$2 a ton are expected by leading traders.

Scrapmen Will Hear Paper About Stora-Kaldo Process

Reasons why the Stora-Kaldo basic oxygen steelmaking process uses more ferrous scrap than the L-D oxygen furnace will be explained at the 34th annual convention of the Institute of Scrap Iron & Steel in January. Authors of the paper are D. R. Berg and L. L. French, Dravo Corp., Pittsburgh.

The announcement that Sharon Steel Corp. will install the process at its Roemer Works has aroused great interest among scrapmen. It will use up to 50 per cent scrap vs. 30 per cent in the L-D furnace.

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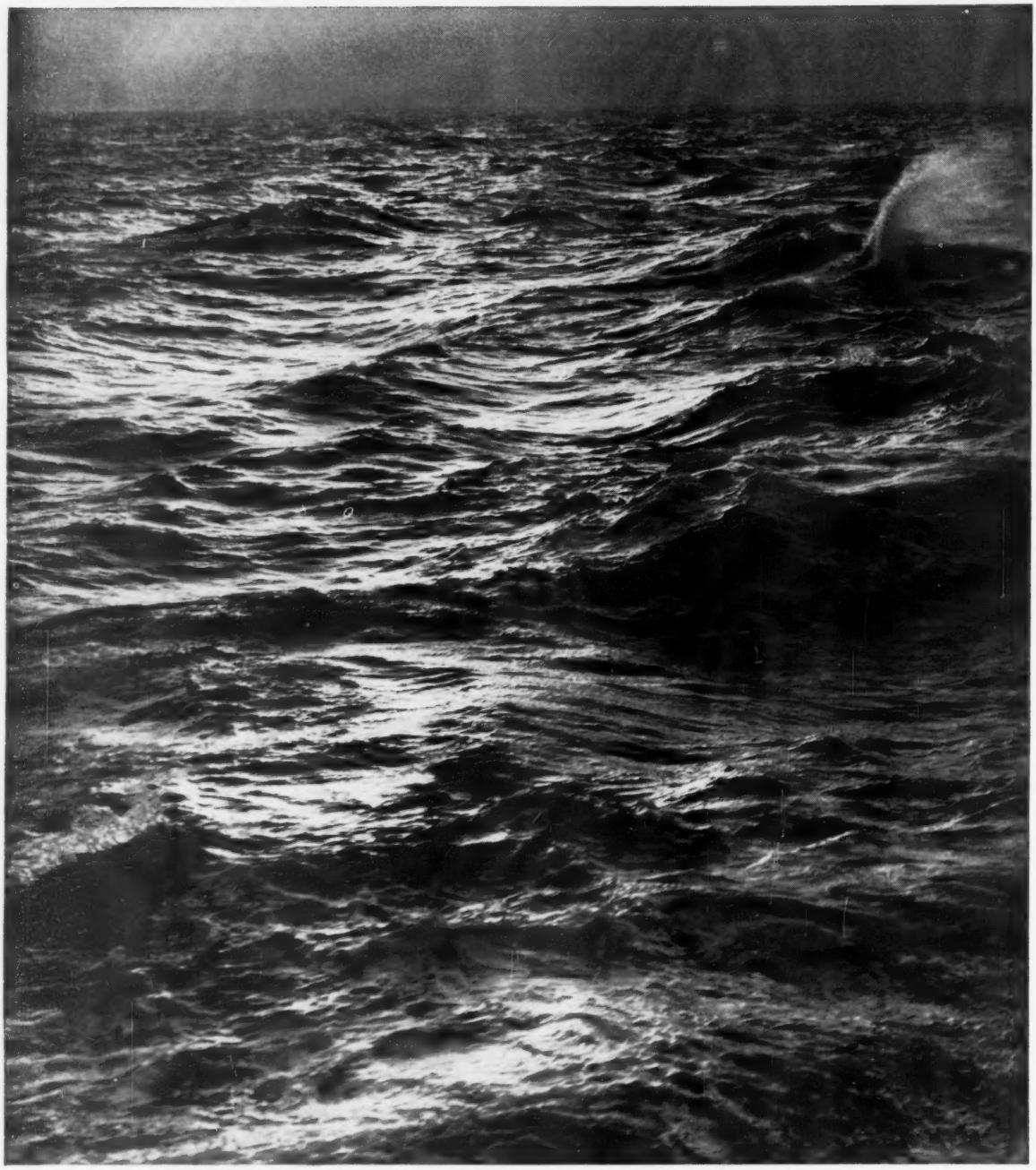

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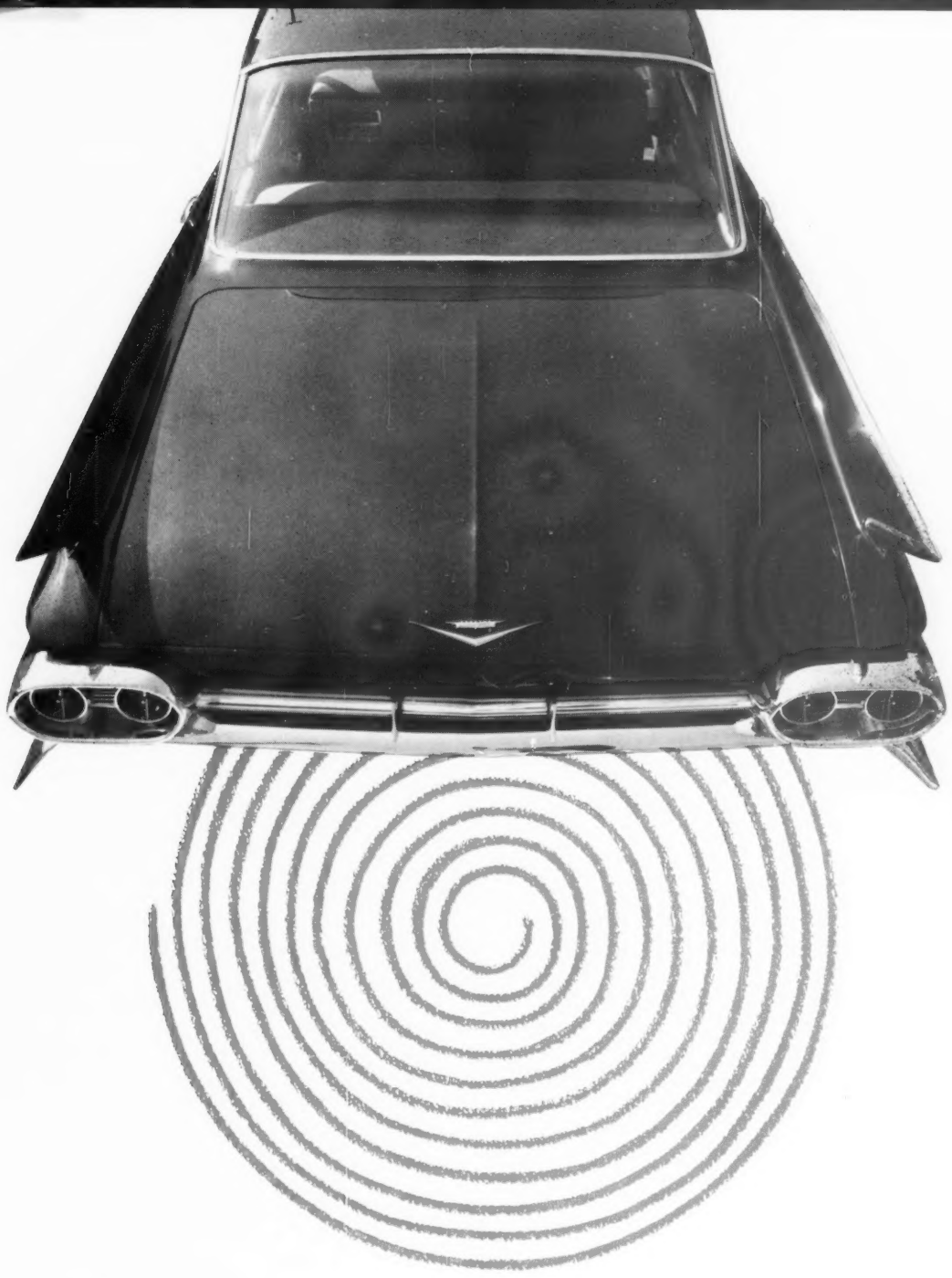

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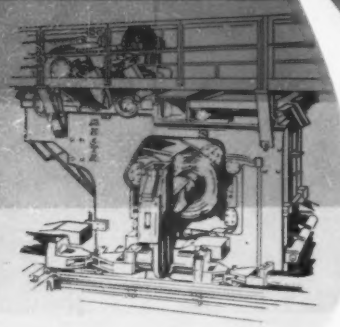

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